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"AS-BUILT" DESIGN SPECIFICATION
FOR MISMAP

Job Order 71-308

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16. Abstract

This document is the "As-Built" Design Specification for the MISMAP program which is part of the CLASFYT package.

The program is designed to compare classification values with ground truth values for a segment and produce a comparison map and summary table.

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MISMAP

1.0 SCOPE

This document contains the description of the implementation of the MISMAP program. The purposes of the program are as follows:

(1) To compare classified pixel values for a segment with corresponding ground truth values.

(2) To produce a comparison map which shows either where the two values agree or indicates the manner of disagreement.

(3) To produce a summary table with the percentage of the scene in each category.

2.0 APPLICABLE DOCUMENTS

The following documents form a part of this specification: AD 63-2457-3308-1 Transferring Badhwar Software.

AD NAS 9-15200 Technical Memorandum Format Specification for LACIE (Phase III) and Accuracy Assessment Computer Data Products.

3.0 SYSTEM DESCRIPTION

3.1 MISMAP PROCESSOR SYSTEM FLOWCHART

The system level data flow diagram for MISMAP is shown in Figure 3.1.

3.2 HARDWARE DESCRIPTION

The MISMAP program operates on the IBM 3031 computer at Purdue, LARS.

3.3 SOFTWARE DESCRIPTION

The MISMAP program is designed to compare the classification results of CLASFYT or other classifiers with ground truth data and produce a comparison "map" via the line printer and summary information which describes the degree of agreement or disagreement of the classifier and ground truth.

Classification data is input to MISMAP via a universally formatted file which contains pixel level codes. Refer to section 3.4.1 for a more detailed description of this file.

Ground truth data is input to MISMAP via a universally formatted file which contains sub-pixel level ground truth codes corresponding to various ground truth classes. There are six sub-pixels of ground truth for each pixel; two sub-pixels across the tree sub-pixels down. Therefore, 3 lines in a sub-pixel image correspond to 1 line in a sub-pixel image.

Refer to section 3.4.2 for a more detailed description of this file.

Majority Rule Code

MISMAP compares the classification and ground truth data at the pixel level and therefore ground truth labels must be assigned to the pixels. In order to do this a concept called "pixel purity" is introduced. The purity of a pixel is defined to be the largest number of sub-pixels in that pixel having the same ground truth code. The purity can range from 6 (i.e. pure), where all the sub-pixels have the same code, to 1 where each of the sub-pixels has a different code.

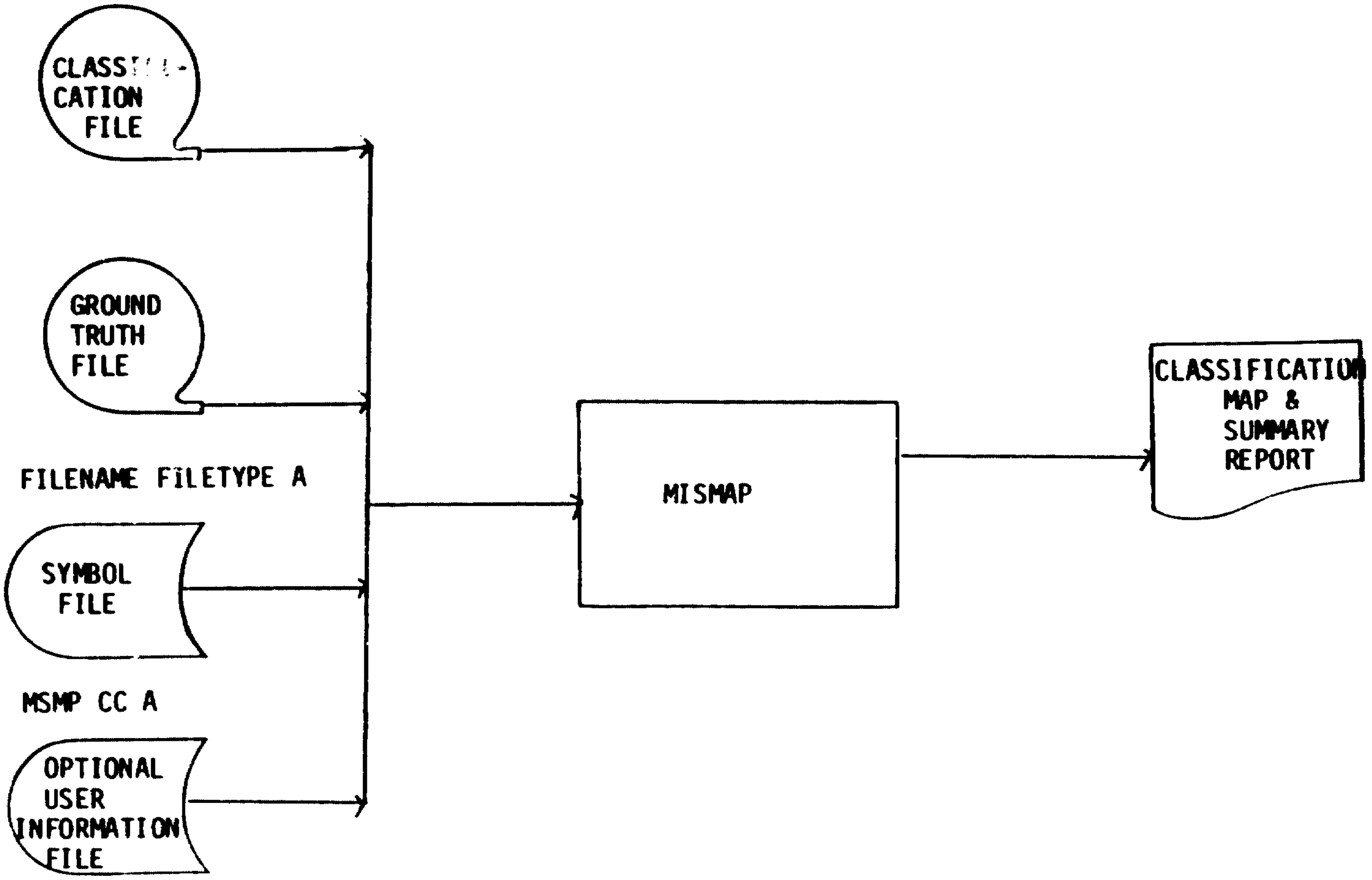
CLASSIFI-CATION FILE
GROUND TRUTH FILE
FILENAME FILETYPE A
SYMBOL FILE
MSMP CC A
OPTIONAL USER INFORMATION FILE
MISMAP
CLASSIFICATION MAP & SUMMARY REPORT

Figure 3.1 MISMAP Processor System Flowchart

A code, called the "Majority Rule Code" is assigned to each pixel whose purity is within a given, user-defined range. The code assigned is the ground truth code associated with the majority of the six ground truth sub pixels. When two or more ground truth codes are equally distributed among the six pixels, the first of these is assigned to the pixel. If the purity of the pixel is not within the specified range, no majority rule code is assigned.

Ground Truth and Classification Transformation

In order to compare the ground truth and classification data, each of the classification codes is transformed into one of six "Classification Categories" and each of the majority rule codes is transformed into one of six "Ground Truth Categories". The object of this is to reduce the total number of codes and to allow the combining of codes. For example, if one was interested in only "small grains" and "other", one might transform all the "small grains" codes into category 1 and all the "other" codes into category 2 for both the classification and ground truth data. The transformation to classification categories and ground truth categories is determined by user defined classification transformations and ground truth transformations (see section (3.4.3).

Some final points to note about the transformations:

1. If the category code is less than 1 or greater than 6, then the program will assign the value 6 (6 is usually reserved in MISMAP for unknown crop type).
2. If any of the codes between 1 and 255 are not assigned a category, then the program will assign a value of 6 as the category.

MISMAP Output and the Character Definition Matrix

As described above, each pixel having a purity within the specified purity range has two numbers associated with it, namely a classification category and a ground truth category. MISMAP outputs a line printer pixel level image composed of characters which indicate what these two numbers are for each pixel. The characters are specified by a user-defined "Character Definition Matrix" (see section 3.4.3) which specifies a particular character to represent each of the 36 combinations of the 6 classification categories and the 6 ground truth categories. On the output any pixel which was not in the specified purity range is represented by the character "?" so it would be inappropriate to choose this character for any of the positions in the character definition matrix.

3.4 FILE DESCRIPTIONS

3.4.1 INPUT DATA FILE CLASSIFICATION FILE

The Classification File output by CLASFYT and input to MISMAP is described here. For a complete description of the universal imagery file format refer to the Earth Resources Data Format Control Book, Volume 1. PH0-TR543.

MISMAP requires a universally formatted classification file with the following characteristics:

1. A header record consisting of 3060 bytes followed by:
2. One hundred seventeen data records consisting of 360 bytes each.

Record	Type	Contents	
1	HEADER	Bytes 1-60	Computing Systems I.D.
		Bytes 2249-2285	Acquisitions used.
		Bytes 2760-2789	PFC Job Ident.
		Bytes 2941-3000	User supplied data.

Record	Type	Contents	
2-118	Data	Bytes 1-72	Ancillary data (ignored by MISMAP).
		Bytes 73-268	Classification data for 196 pixels (1/Byte).
		Bytes 269-360	Bytes of zero fill.

3.4.2 INPUT DATA FILE GROUND TRUTH FILE

The Ground Truth File input to MISMAP is described here. For a complete description of the universal imagery file format refer to the Earth Resources Data Format Control Book, Volume 1 PH0-TR543.

MISMAP requires a universally formatted ground truth file with the following characteristics:

1. A header record consisting of 3060 bytes followed by:
2. 351 records consisting of 540 bytes.

Record	Type	Contents	
1	Header	Bytes 1-60	Computing System I.D.
		Bytes 2249-2285	Acquisitions used.
		Bytes 2760-2789	PFC job Ident.
		Bytes 2941-3000	User supplied data
2-352	Data	Bytes 1-72	Ancillary data (ignored by (MISMAP)
		Bytes 73-464	Ground truth crop codes which have been biased with-128 and stored as 8-bit two's-complement notation. (1 sub-pixel/byte).
		Bytes 465-540	
		Bytes 465-540	Unused by MISMAP (must be present).

CHARACTER DEFINITION MATRIX

GROUND TRUTH CATEGORY

		-1-	-2-	-3-	-4-	-5-	-6-
	-1-	C	+	$	#	#	#
	-2-	-		%	#	#	#
CLASSIFICATION CATEGORY	-3-	T	T	T	#	#	#
	-4-	#	#	#	#	#	#
	-5-	#	#	#	#	#	#
	-6-	#	#	#	#	#	#

Figure 3.2 Examples of Character Definition Matrix for Classification and Ground Truth Categories

CLASSIFICATION TRANSFORMATIONS

1 TO 14 = 6
15 TO 15 = 3
16 TO 99 = 6
100 TO 199 = 2
200 TO 206 = 6
207 TO 207 = 2
208 TO 238 = 6
239 TO 239 = 1
240 TO 255 = 6

GROUND TRUTH TRANSFORMATIONS

1 TO 10 = 1
11 TO 79 = 2
80 TO 80 = 3
81 TO 91 = 2
92 TO 92 = 1
93 TO 116 = 2
117 TO 117 = 1
118 TO 163 = 2
164 TO 164 = 3
165 TO 255 = 2

Figure 3.3 Examples of Classification and Ground Truth Transformations

3.4.3 USER DEFINED FILE (SYMBOL FILENAME) (SYMBOL FILETYPE) A

This file is used to specify (1) the pixel purity range, (2) the character definition matrix, (3) the ground truth transformations, (4) the classification transformations, and (5) a skip factor.

A typical character definition matrix is shown in figure 3.2. The lines correspond to classification categories and the columns to ground truth categories. In the example shown a pixel which had a classification category of 1 and a ground truth category of 2 would be represented on the output map by the symbol + .

Typical ground truth and classification transformations are shown in figure 3.3. Each transformation gives a range of codes and the category they are to be transformed into.

The skip flag is normally set to zero. However sometimes there are 50 color records following the header record of the classification file. In this case the skip flag must be set to some non zero number. The 50 records are then read into a dummy variable before the first data record is processed.

The symbol file may be a permanent or temporary "card image" file and must have the following form.

SYMBOL FILE

Record	Columns	Format	Content
1	1	I1	Lower limit of pixel purity range.
	2	1X	Ignored.
	3	I1	Upper limit of pixel purity range.
2	1-6	6A1	Character definition matrix, row 1.
3	1-6	6A1	Character definition matrix, row 2.
. . .			
7	1-6	6A1	Character definition matrix, row 6. (last row).
8	1-5	I5	Lower limit of majority rule code range.
	6-10	I5	Upper limit of majority rule code range.
	11-15	I5	Ground truth category for the described range.
9-M	1-15	3I5	As many records as are required, in the same format as record 8, to describe the ground truth transformations.
M+1	1-15	3I5	Three zeros, right adjusted, indicating the end of ground truth transformation records.
M+2 to N	1-15	3I5	Records describing the classification transformations. Format is identical to records 8 to M+1.

Record	Column	Format	Content
N+1	1-15	3I5	Three zeros, right adjusted, indicating the end of classification transformation records.
N+2	1	I1	Skip factor. If nonzero, color records are assumed to precede the classification file data and are skipped. If no color records are present this field must be set to zero.

Default values for Ground Truth and Classification Transformations

A default category code of 6 is automatically assigned if a classification code or majority rule code is not included in any transformation. In addition, a transformation code of less than 1 or greater than 6 is changed to 6.

The following is an annotated listing of a SYMBOL file example:

Example

```
FILE:  SYMBOL  CORN  A (file name)

1 6                  (Low, high range of pixel purity)
C+$###               character definition matrix
- %###
TTT###
######
######
######
    1   10    1
   11   79    2
   80   80    3      Ground truth
   81   91    2      Transformation records
   92   92    1
   93  116    2
  117  117    1
  118  163    2
  164  164    3
  165  165    2
    0    0    0      End of ground truth transformation records
```

```
      1    14    6
     15    15    3
     16    99    6
    100   199    2    Classification transformation records.
    200   206    6
    207   207    2
    208   238    6
    239   239    1
    240   255    6
      0     0    0    End of classification transformation records.
0                     Color record skip indicator.
```

3.4.4 USER DEFINED FILE -- MSMP CC A

The user information file "MSMP" is optional, and its contents are printed in the header for informational purposes only. The contents could identify the run by analyst name, date, acquisition numbers, or other appropriate comments. The information in MSMP is entered in free field card image format and as many card images as necessary may be used. For an example, see the input summary in the output in Appendix B.

3.5 DETAILED SOFTWARE DESCRIPTION

3.5.1 MISMAP PROGRAM

Purpose

MISMAP compares the results of CLASFYT or other classifiers with ground truth data and produces a comparison "map" and summary information which describes the degree of agreement or disagreement of the classifier and ground truth.

Linkages

MISMAP calls MSMP.

Interface

Calling sequence:

Not applicable. (A description of MISMAP EXEC which loads and executes MISMAP can be found in Section 4.0).

Calling sequence parameters:

Not applicable.

Function value:

Not applicable.

Labeled COMMON parameters:

None.

Blank COMMON parameters:

None.

Inputs

Unit	Type	Description
9		Universal formatted ground truth file.
10		Universal formatted classification file .
19		Symbol file.
21		Card control file.

Outputs

Unit	Type	Description
5	Terminal	Runtime errors.
6	Printer	Program report.

Storage requirement

Not applicable.

Description

MISMAP first reads the following information from the "Symbol" file:

1. The range of pixel purity which is used for the majority rule for pixels.
2. The character definition matrix which contains the symbols printed in the map.
3. The ground truth classification transformations.
4. The color record skip factor.

Next MISMAP calls the subroutine MSMP (reference 3.5.2) to read the optional user information file (3.4.1) and print it as an "input summary" at the top of the Comparison Map.

Next MISMAP prints the following header information from the Symbol file:

1. Character definition matrix.
2. Pixel purity range.
3. Ground truth transformations.
4. Classification transformations.

Continuing, MISMAP reads the header records and prints for each input file the following information:

1. Computing system ID.
2. Acquisitions used.
3. User supplied data (from header record).
4. The segment number.

The skip factor is read and since color records are not needed, they are read into a dummy variable if they are present.

Next the main part of MISMAP is executed for each of the 117 lines of the scene. It does the following:

1. Reads a line Classificatin data.
2. Reads a line of the Ground Truth data.
3. Transforms the classification value and ground truth value for each pixel to pair of codes (each between 1 and 6) representing the particular crop. It uses these codes as indices to the 6x6 character definition matrix to determine the appropriate map symbol.
4. Keeps a count of the number of times each symbol occurs.
5. Prints the line of symbols on the comparison map.

Finally, MISMAP computes the percentages of pixels in each category and the percentage of the scene in which disagreement occurred between the two files.

Flowchart

Not applicable.

Listing

See Appendix A for program listing.

3.5.2 SOFTWARE COMPONENT NO. 1 (MSMP)

Purpose

The MSMP subroutine prints the user information file in the heading for the report.

Linkages

MSMP is called by MISMAP.
MSMP calls CPTIME, a library routine.

Interface

Calling sequence:

CALL MSMP.

Calling sequence parameters:

None.

Function value:

Not applicable.

Labeled COMMON parameters:

None.

Blank COMMON parameters:

None.

Inputs

Unit	Type	Description
21	Seq. data	Control card file (See Section 3.4.1).

Outputs

Unit	Type	Description
6	Printer	Program report.

Storage requirement

Not applicable.

Description

MSMP reads the user information file (optional on A disk) and prints the card images in the heading of the report.

Flowchart

Not applicable.

Listing

See Appendix A for routine listing.

4.0 OPERATION

4.1 OPERATING DESCRIPTION

MISMAP is operational on the IBM 3031 computer at LARS, West Lafayette, Indiana.

The MISMAP program is one of the programs of the BADHWAR SYSTEM which includes the programs CLASFYT, MISMAP, PARPLT, PARHIS, and PARCLS.

MISMAP requires the use of a D disk which is assigned as a temporary disk and an E disk which is used to temporarily store certain LARS routines. The user, therefore, must not assign a disk to his machine using either MODE E or MODE D. These disks will be assigned as needed.

Prior to executing the MISMAP program the user must (1) establish on his A disk a SYMBOL file as described in section 3.4.3 and (2) establish the optional USER INFORMATION file as described in section 3.4.4, if he wishes to use this file.

4.2 COMMANDS DESCRIPTION

To execute MISMAP the user will enter a series of commands which invoke the JOB CONTROL SOFTWARE. These commands are divided into two classes namely (1) FUNCTION commands and (2) PROGRAM commands. The FUNCTION commands, which perform all the functions except executing the program are reusable; i.e., once they are invoked they remain in effect until reentered. The PROGRAM commands, which execute the program, must be reentered each time the program is to be excuted.

The following list gives the commands required to execute the MISMAP program. They are all FUNCTION commands except the PROGRAM command MISMAP. These commands must be given in the listed order except that the order of the DEFGTRU command and the DEFCLAS command may be interchanged.

```
START

DEFGTRU......

DEFCLAS......

MISMAP ......

END
```

The following sections describe each of the commands in detail. Input fields are separated by blanks. If more than one word is required to describe an input field, the descriptive text is enclosed in pointed brackets <>. If an input is optional the field is enclosed in square brackets []. Do not include these explanatory characters <> [] when actually submitting input to the computer. To enter a command the user types one input per defined input field and separates each field with a blank.

4.2.1 START

The START command spools the user's console file. The use of this command, along with the END command, will provide a listing of all information appearing on the user's console file. (If running an interactive job, this is the terminal; if running a batch job, this is a system defined device.) The START command is invoked by the user typing the following:

```
START
```

4.2.2 DEFGTRU

The DEFGTRU command defines a Ground Truth File. The user can use this command to define Ground Truth files on tape, disk, or the LARS RT&E Data Base. In the latter case a series of programs are invoked to provide interface with the data base. The following diagram illustrates this software flow.

```
                 ..RTEERR (LARS ROUTINE)

DEFGTRU.......GTRUINF....

                 ..GTINFO (LARS ROUTINE)
```

For a detailed description of the above JOB CONTROL SOFTWARE see appendix B.

The DEFGTRU command has the following forms and is invoked by typing one of the following, according to the user's requirement.

If the file is on tape -

```
DEFGTRU TAPE# FILE# <TAPE DENSITY>
```

If the file is on disk -

```
DEFGTRU FILENAME FILETYPE FILEMODE
```

If the file is on the LARS Data Base -

```
DEFGTRU SEGMENT# YEAR
(year-last two digits of data generation year)
```

This command remains in effect for the use of any of the BADHWAR SYSTEM PROGRAM commands and does not have to be reissued unless the user wishes to redefine the input Ground Truth File.

4.2.3 DEFCLAS

The DEFCLAS command defines the input Classification or Cluster file. The user can use this command to define a Class or Cluster file on tape or disk. The DEFCLAS command has the following forms and is invoked by typing one of the following, according to the user's requirement.

If the file is on tape -

```
DEFCLAS TAPE# FILE# <FILE DENSITY>
```

If the file is on disk -

```
DEFCLAS FILENAME FILETYPE FILEMODE
```

This command remains in effect for the use of any of the BADHWAR SYSTEM PROGRAM commands and does not have to be reissued unless the user wishes to redefine the input Classification or Cluster File.

4.2.4 MISMAP

The MISMAP command is a PROGRAM command and is used to invoke the execution of the MISMAP program. This command must not be used unless the DEFCLAS and the DEFGTRU FUNCTION commands have been previously issued. Also, as previously stated the user must have established a SYMBOL FILE on his A disk before invoking this command. The MISMAP command is invoked by the user typing the following:

```
MISMAP <SYMBOL FILENAME> <SYMBOL FILETYPE>
```

The output from the MISMAP program is spooled to the HOUSTON line printer. The output consists of a MAP and the USER INFORMATION file if this file was defined.

4.2.5 END

This command closes the user's console file and causes a spooled copy to be sent to the HOUSTON printer. This command has no effect if the START command was not previously issued. The END command is invoked by the user typing the following:

```
END
```

4.3 OPERATING EXAMPLE

For our example we will assume the following:

The symbol file is established on the user's A disk under the file description:

```
0882 79082 A
```

The user has two different Classification files which he wishes to input to the MISMAP PROGRAM. He will therefore, issue two PROGRAM commands in his command sequence.

Furthermore, the user has selected to use a ground truth file at LARS.

COMMAND	EXPLANATION OR ACTION TAKEN
START	Spools the console file.
DEFGTRU 882 79	Defines a ground truth file using data from the LARS Data Base.
DEFCLAS 088279 079 B	Defines a Class file on the users B disk. This data is on a disk which the user has previously attached to his disk using a B mode.

MISMAP 0882 79082	Executes the MISMAP PROGRAM.
DEFCLAS 2345 23 1600	Redefines the class file. This file is from a 1600 BPI tape.
MISMAP 0882 79082	Executes the MISMAP PROGRAM. The user has chosen to define his symbol file the same as in the previous execution of MISMAP.
END	Closes the user's console file and spools the file to the HOUSTON printer.

APPENDIX A
MISMAP PROGRAM LISTINGS

```
*LEVEL 2.3.0 (JUNE 78)                    OS/360  FORTRAN H EXTENDED               DATE 81.139/13.25.58        PAGE   1
REQUESTED OPTIONS: NOTERM
OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
                   SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
                  CCCC      PROGRAM MISMAP                                                    MIS00010
                  C                                                                           MIS00020
                  C      THIS PROGRAM COMPARES A CLASSIFICATION FILE WITH THE GROUND          MIS00030
                  C      TRUTH. A SYMBOL IS PRINTED OUT WHICH DEPENDS ON THE GROUND TRUTH     MIS00040
                  C      AND CLASSIFICATION LABELS. THERE ARE UP TO 6 POSSIBILITIES FOR       MIS00050
                  C      THE LABELS. THE SIXTH LABEL IS RESERVED FOR UNEXPECTED CODES. ALL    MIS00060
                  C      CODE TRANSFORMATIONS ARE SET TO 6 BY DEFAULT.                        MIS00070
                  C                                                                           MIS00080
                  C                                                                           MIS00090
                  C                                                                           MIS00100
                  C      THE OPTIONAL USER INPUT INFORMATION FILE "MSMP CC" MAY CONTAIN       MIS00110
                  C      THE DATE, USER NAME, SEGMENT NUMBER FOR THE FILES,AND ANY            MIS00120
                  C      COMMENTS WHICH THE USER WANTS.                                       MIS00130
                  C                                                                           MIS00140
                  C      THE DATA FILE "SYMBOL (AGRICULTURAL PRODUCT)" HAS A FILE TYPE        MIS00150
                  C      SPECIFIED BY THE USER, FOR EXAMPLE ,"SYMBOL CORN".  IT CONTAINS      MIS00160
                  C      THE TRANSFORMATIONS AND CHARACTERS TO BE USED IN THE RUN.            MIS00170
                  C      THE ORDER IS:                                                        MIS00180
                  C            1. RANGE OF PIXEL PURITY - LOWER AND UPPER LIMITS ON PIXEL     MIS00190
                  C               PURITIES WHICH WILL BE CONSIDERED IN AN (I1,1X,I1) FORMAT.MIS00200
                  C               (PIXELS WITH PURITY OUTSIDE THE PRESCRIBED RANGE ARE        MIS00210
                  C               DISPLAYED AS A "?".)                                        MIS00220
                  C            2. CHARACTER MATRIX - 6 LINES WITH 6 SYMBOLS PER LINE          MIS00230
                  C               IN A (6A1) FORMAT.  (EACH LINE CORRESPONDS TO A             MIS00240
                  C               DIFFERENT CLASSIFICATION LABEL.)                            MIS00250
                  C            3. GROUND TRUTH TRANSFORMATIONS - 1 LINE FOR EACH              MIS00260
                  C               TRANSFORMATION IN THE FORM STARTING CODE, ENDING CODE,      MIS00270
                  C               AND NEW CODE IN A (3I5) FORMAT.                             MIS00280
                  C            4. CLASSIFICATION TRANSFORMATIONS - SAME FORMAT AS ABOVE.      MIS00290
                  C            5. SINCE THE CLASSIFICATION FILES MAY OR MAY NOT HAVE THE      MIS00300
                  C               COLOR RECORDS AT THE BEGINNING OF THE DATA,THERE            MIS00310
                  C               IS A SKIP FLAG IN THE SYMBOL CORN FILE. IF THE SKIP         MIS00320
                  C               FLAG IS NOT ZERO, 50 RECORDS WILL BE SKIPPED BEFORE         MIS00330
                  C               THE FIRST RECORD IS PROCESSED.                              MIS00340
                  C                                                                           MIS00350
                  C      THIS PROGRAM IS BASED ON THE PROGRAM AASGMAP.  THE OUTPUT IS IN      MIS00360
                  C      THE SAME FORMAT.  AND THE DETERMINATION OF THE GROUND TRUTH LABEL    MIS00370
                  C      IS MADE IN THE SAME MANNER, EXCEPT THAT THE TRANSFORMATION IS        MIS00380
                  C      MADE BEFORE THE MAJORITY RULE IS DETERMINED.                         MIS00390
                  C                                                                           MIS00400
                  C                                                                           MIS00410
                  C      PROGRAM DEVELOPED BY J. CARNES,3/19/79, MODIFIED FOR IBM CMS         MIS00420
                  C      BY P. BROWN AD. CHENG, 12/1/80.                                      MIS00430
                  C                                                                           MIS00440
      ISN 0002           IMPLICIT INTEGER (A-Q,S-Z)                                           MIS00450
      ISN 0003           DIMENSION ISITE(64,3),GT(255),DT(255),MT(6),RSUM(6,6),RTOT(6)        MIS00460
      ISN 0004           DIMENSION RTOTP(6), RSUMP(6,6), PIXNUM(10)                           MIS00470
      ISN 0005           LOGICAL*1 SYM(6,6),DTFLNM(26),GTFLNM(26),DTBUF(360),GTBUF(1,540),    MIS00480
                        *CHAR(94),GTBUF1(6,270),HDR(3060),QCHAR                               MIS00490
      ISN 0006           EQUIVALENCE (GTBUF(1),GTBUF1(1,1))                                   MIS00500
      ISN 0007           DATA QCHAR/'?'/                                                      MIS00510
      ISN 0008           DIMENSION KLDATE(3),GTDATE(3)                                        MIS00520
                  C                                                                           MIS00530
                  C                                                                           MIS00540
                  C SET ERROR FLAG ON RANGE CHECKING                                           MIS00550
                  C                                                                           MIS00560
      ISN 0009           IERR = 0                                                             MIS00570
                  C                                                                           MIS00580
                  C      READ IN RANGE OF PIXEL PURITY                                        MIS00590
                  C                                                                           MIS00600
      ISN 0010           READ(19,937) NPURL,NPURU                                             MIS00610
      ISN 0011       937 FORMAT(I1,1X,I1)                                                     MIS00620
      ISN 0012           IF((NPURL.GE.1.AND.NPURL.LE.255).AND.                                MIS00630
                        &    (NPURU.GE.1.AND.NPURU.LE.255).AND.                               MIS00640
                        &    (NPURL.LE.NPURU))GO TO 4000                                      MIS00650
      ISN 0014           WRITE(6,2000) NPURL,NPURU                                            MIS00660
      ISN 0015      2000 FORMAT(' PIXEL PURITY RANGE',I3,I3,' - UNACCEPTABLE')                MIS00670
      ISN 0016           IERR = 1                                                             MIS00680
                  C                                                                           MIS00690
                  C      READ IN CHARACTER MATRIX. (I = CLASSIFICATION, J = GROUND TRUTH)     MIS00700
                  C                                                                           MIS00710
      ISN 0017      4000 DO 1 I=1,6                                                           MIS00720
      ISN 0018         1 READ(19,5000) (SYM(I,J),J=1,6)                                       MIS00730
ISN 0019      900 FORMAT(6A1)                                                       MS00740
            C                                                                       MS00750
            C     SET GROUND TRUTH TRANSFORMATION ARRAY TO ALL 6'S.                 MS00760
            C                                                                       MS00770
ISN 0020          DO 2 I=1,255                                                      MS00780
ISN 0021        2 GT(I)=6                                                           MS00790
            C                                                                       MS00800
            C     LOAD GROUND TRUTH TRANSFORMATION DATA FROM "SYMBOL" FILE.         MS00810
            C                                                                       MS00820
ISN 0022        3 READ(19,901) NB,NF,NO                                             MS00830
ISN 0023      901 FORMAT(3I5)                                                       MS00840
ISN 0024          IF(NB.EQ.0.AND.NF.EQ.0.AND.NO.EQ.0) GO TO 5                       MS00850
ISN 0026          IF(NB.GE.1.AND.NB.LE.255.AND.NF.GE.1.AND.NF.LE.255)GO TO 2110     MS00860
ISN 0028          WRITE(5,2105)NB,NF,NO                                             MS00870
ISN 0029     2105 FORMAT(' GROUND TRUTH SYMBOL TABLE RANGE',I5,I5,1X,A1,            MS00880
                 &       ' - UNACCEPTABLE')                                         MS00890
ISN 0030          IERR = 1                                                          MS00900
ISN 0031          GO TO 5                                                           MS00910
ISN 0032     2110 IF(NO.GT.6.OR.NO.LT.1) NO=6                                       MS00920
ISN 0034          DO 4 I=NB,NF                                                      MS00930
ISN 0035        4 GT(I)=NO                                                          MS00940
ISN 0036          GO TO 3                                                           MS00950
            C                                                                       MS00960
            C     SET CLASSIFICATION TRANSFORMATION ARRAY TO ALL 6'S                MS00970
            C                                                                       MS00980
ISN 0037        5 DO 6 I=1,255                                                      MS00990
ISN 0038        6 DT(I)=6                                                           MS01000
            C                                                                       MS01010
            C     LOAD CLASSIFICATION TRANSFORMATION DATA FROM "SYMBOL" FILE.       MS01020
            C                                                                       MS01030
ISN 0039        7 READ(19,901) NB,NF,NO                                             MS01040
ISN 0040          IF(NB.EQ.0.AND.NF.EQ.0.AND.NO.EQ.0) GO TO 9                       MS01050
ISN 0042          IF(NB.GE.1.AND.NB.LE.255.AND.NF.GE.1.AND.NF.LE.255)GO TO 2130     MS01060
ISN 0044          WRITE(5,2120)NB,NF,NO                                             MS01070
ISN 0045     2120 FORMAT(' CLASS SYMBOL TABLE RANGE',I5,I5,1X,A1,' - UNACCEPTABLE') MS01080
ISN 0046          IERR = 1                                                          MS01090
ISN 0047          GO TO 9                                                           MS01100
ISN 0048     2130 IF(NO.GT.6.OR.NO.LT.1) NO=6                                       MS01110
ISN 0050          DO 8 I=NB,NF                                                      MS01120
ISN 0051        8 DT(I)=NO                                                          MS01130
ISN 0052          GO TO 7                                                           MS01140
            C                                                                       MS01150
            C     READ THE COLOR RECORD'S SKIP FLAG                                 MS01160
            C                                                                       MS01170
ISN 0053        9 READ(19,902)SKIP                                                  MS01180
ISN 0054      902 FORMAT(I1)                                                        MS01190
            C                                                                       MS01200
            C     WRITE USER'S INPUT SUMMARY FROM CONTROL CARD IMAGES IN MSMP FILE  MS01210
            C     AND PRINT OUT CURRENT TIME                                        MS01220
            C                                                                       MS01230
ISN 0055          CALL MSMP                                                         MS01240
            C                                                                       MS01250
            C                                                                       MS01260
            C BEFORE REPORT CAN BE PRINTED CERTAIN BYTES MUST BE READ               MS01270
            C                                                                       MS01280
ISN 0056          READ(10,2135)(HDR(I),I = 1,3060)                                  MS01290
ISN 0057     2135 FORMAT(17(180A1))                                                 MS01300
ISN 0058          KLASEG = HDR(67)*2**8 + HDR(68)                                   MS01310
ISN 0059          KDAY = HDR(61)                                                    MS01320
ISN 0060          KMON = HDR(62)                                                    MS01330
ISN 0061          KYR  = HDR(63)                                                    MS01340
ISN 0062          REWIND 10                                                         MS01350
            C                                                                       MS01360
            C                                                                       MS01370
            C CALL ROUTINE TO CHANGE DAY MO. YEAR TO JULIAN DATE                    MS01380
            C                                                                       MS01390
ISN 0063          CALL JULIAN(KLDATE,JERR,   KDAY,KMON,KYR)                         MS01400
ISN 0064          IF(JERR.NE.0)IERR = 1                                             MS01410
            C                                                                       MS01420
ISN 0066          LUN = 9                                                           MS01430
ISN 0067          DO 3000 ISEG = 1,2                                                MS01440
ISN 0068          READ(LUN,2135)(HDR(I),I = 1,3060)                                 MS01450
ISN 0069          IF(ISEG.EQ.2)GO TO 2180                                           MS01460
ISN 0071          GTRSEG = HDR(67)*2**8 + HDR(68)                                   MS01470
ISN 0072          TDAY = HDR(61)                                                    MS01480
ISN 0073          TMON = HDR(62)                                                    MS01490
ISN 0074          TYR = HDR(63)                                                     MS01500
            C                                                                       MS01510
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           C                                                                    MIS01520
           C CALL ROUTINE TO CHANGE DAY MO, YEAR TO JULIAN DATE                 MIS01530
           C                                                                    MIS01540
ISN 0075         CALL JULIAN(GTDATE,JERR,   TDAY,TMON,TYR)                      MIS01550
ISN 0076         IF(JERR.NE.0)IERR = 1                                          MIS01560
           C                                                                    MIS01570
           C                                                                    MIS01580
           C     WRITE FIRST PAGE OF PRINTOUT WITH TRANSFORMATIONS AND          MIS01590
           C     CHARACTER MATRIX.                                              MIS01600
           C                                                                    MIS01610
ISN 0078         WRITE(6,910)                                                   MIS01620
ISN 0079     910 FORMAT(//,10X,'COMPARISON MAP OF CLASSIFICATION RESULTS',      MIS01630
                *' WITH GROUND TRUTH')                                          MIS01640
ISN 0080         WRITE(6,2140)GTRSEG,TYR,(GTDATE(I),I = 1,3)                    MIS01650
ISN 0081    2140 FORMAT(//10X,'GROUND TRUTH FILE -',11X,I4,I2,I1,I1,I1)         MIS01660
ISN 0082         WRITE(6,2145)KLASFG,KYR,(KLDATE(I),I = 1,3)                    MIS01670
ISN 0083    2145 FORMAT(10X,'CLASSIFICATION FILE -',9X,I4,I2,I1,I1,I1,          MIS01680
                & //27X,'CHARACTER DEFINITION MATRIX')                          MIS01690
ISN 0084         WRITE(6,911) (I,I=1,6)                                         MIS01700
ISN 0085     911 FORMAT(1H0,29X,'GROUND TRUTH CATEGORIES'/30X,6('-',I1,'- '))   MIS01710
ISN 0086         DO 117 I=1,2                                                   MIS01720
ISN 0087     117 WRITE(6,912) I,(SYM(I,J),J=1,6)                                MIS01730
ISN 0088     912 FORMAT(1H0,25X,'-',I1,'-',6(' "',A1,'"'))                      MIS01740
ISN 0089         WRITE(6,913) (SYM(3,J),J=1,6)                                  MIS01750
ISN 0090     913 FORMAT(1H0,10X,'CLASSIFICATION -3-',6(' "',A1,'"')/11X,        MIS01760
                *'CATEGORIES')                                                  MIS01770
ISN 0091         WRITE(6,914) ((SYM(I,J),J=1,6),I=4,6)                          MIS01780
ISN 0092     914 FORMAT(1H ,25X,'-4-',6(' "',A1,'"')//26X,'-5-',6(' "',A1,'"')//MIS01790
                *26X,'-6-',6(' "',A1,'"')/)                                     MIS01800
           C                                                                    MIS01810
           C     PRINT OUT RANGE OF PIXEL PURITY.                               MIS01820
           C                                                                    MIS01830
ISN 0093         WRITE(6,938) NPURL,NPURU                                       MIS01840
ISN 0094     938 FORMAT(1H0,10X,'PIXEL PURITY RANGE - FROM ',I1,' TO ', I1,     MIS01850
                *' SUBPIXELS'//)                                                MIS01860
           C                                                                    MIS01870
           C     PRINT OUT THE GROUND TRUTH TRANSFORMATIONS.                    MIS01880
           C                                                                    MIS01890
ISN 0095         WRITE(6,915)                                                   MIS01900
ISN 0096     915 FORMAT(1H0,10X,'GROUND TRUTH TRANSFORMATIONS'/)                MIS01910
ISN 0097         NO=GT(1)                                                       MIS01920
ISN 0098         NB=1                                                           MIS01930
ISN 0099         DO 109 I=2,255                                                 MIS01940
ISN 0100         IF(GT(I).EQ.NO) GO TO 109                                      MIS01950
ISN 0102         NE=I-1                                                         MIS01960
ISN 0103         WRITE(6,916) NB,NE,NO                                          MIS01970
ISN 0104     916 FORMAT(1H ,17X,I3,' TO ',I3,' = ',I1)                          MIS01980
ISN 0105         NO=GT(I)                                                       MIS01990
ISN 0106         NB=I                                                           MIS02000
ISN 0107     109 CONTINUE                                                       MIS02010
ISN 0108         NE=255                                                         MIS02020
ISN 0109         WRITE(6,916) NB,NE,NO                                          MIS02030
           C                                                                    MIS02040
           C     PRINT OUT CLASSIFICATION TRANSFORMATIONS.                      MIS02050
           C                                                                    MIS02060
ISN 0110         WRITE(6,917)                                                   MIS02070
ISN 0111     917 FORMAT(1H0,10X,'CLASSIFICATION TRANSFORMATIONS'/)              MIS02080
ISN 0112         NO=DT(1)                                                       MIS02090
ISN 0113         NB=1                                                           MIS02100
ISN 0114         DO 110 I=2,255                                                 MIS02110
ISN 0115         IF(DT(I).EQ.NO) GO TO 110                                      MIS02120
ISN 0117         NE=I-1                                                         MIS02130
ISN 0118         WRITE(6,916) NB,NE,NO                                          MIS02140
ISN 0119         NO=DT(I)                                                       MIS02150
ISN 0120         NB=I                                                           MIS02160
ISN 0121     110 CONTINUE                                                       MIS02170
ISN 0122         NE=255                                                         MIS02180
ISN 0123         WRITE(6,916) NB,NE,NO                                          MIS02190
           C                                                                    MIS02200
           C     PRINT OUT CONTENTS OF HEADER RECORD.                           MIS02210
           C                                                                    MIS02220
ISN 0124         WRITE(6,2150)GTRSEG,TYR,(GTDATE(I),I = 1,3)                    MIS02230
ISN 0125    2150 FORMAT(////,11X,'HEADER INFORMATION FOR GROUND TRUTH FILE',11X,I4,MIS02240
                &               I2,I1,I1,I1)                                    MIS02250
ISN 0126         GO TO 2190                                                     MIS02260
ISN 0127    2180 WRITE(6,2185)KLASFG,KYR,(KLDATE(I),I = 1,3)                    MIS02270
ISN 0128    2185 FORMAT(////,11X,'HEADER INFORMATION FOR CLASS FILE',9X,I4,I2,I1,I1MIS02280
                &                ,I1)                                           MIS02290
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ISN 0129          2190 WRITE(6,932)(HDR(I),I = 1,60)                                MIS02300
ISN 0130           932 FORMAT(1H0,10X,'COMPUTING SYSTEM ID = ',60A1)                 MIS02310
ISN 0131               WRITE(6,933) (HDR(I),I=2249,2285)                             MIS02320
ISN 0132           933 FORMAT(1H0,10X,'ACQUISITIONS USED    = ',5(8A1,3X))           MIS02330
ISN 0133               WRITE(6,934) (HDR(I),I=2760,2789)                             MIS02340
ISN 0134           934 FORMAT(1H0,10X,'PFC JOB IDENT.       = ',30A1,/)              MIS02350
ISN 0135               IF(ISEG.EQ.2)WRITE(6,2195)                                    MIS02360
ISN 0137          2195 FORMAT(33X,'(SAMPLE,LINE)')                                   MIS02370
ISN 0138           122 WRITE(6,935) (HDR(I),I=2941,3000)                             MIS02380
ISN 0139               LUN = 10                                                      MIS02390
ISN 0140          3000 CONTINUE                                                      MIS02400
                C                                                                    MIS02410
                C                                                                    MIS02420
                C CHECK TO SEE IF TAPES ARE FOR SAME SEGMENT                         MIS02430
                C                                                                    MIS02440
ISN 0141                IF(KLASEG.EQ.GTRSEG)GO TO 3010                               MIS02450
ISN 0143                WRITE(5,3005)KLASEG,GTRSEG                                   MIS02460
ISN 0144          3005 FORMAT(' CLASS FILE FOR SEG.',I5,' GROUND TRUTH FILE FOR SEG',I5) MIS02470
ISN 0145                IERR = 1                                                     MIS02480
ISN 0146           935 FORMAT(11X,'USER SUPPLIED DATA   = ',60A1)                    MIS02490
                C                                                                    MIS02500
                C       CLEAR SUMMING ARRAY.                                         MIS02510
                C                                                                    MIS02520
ISN 0147          3010 IF(IERR.NE.0)GO TO 9000                                       MIS02530
ISN 0149               DO 118 I=1,6                                                  MIS02540
ISN 0150               DO 118 J=1,6                                                  MIS02550
ISN 0151           118 NSUM(I,J)=0.                                                  MIS02560
                C                                                                    MIS02570
                C       PRODUCE COMPARISON MAP FROM DATA IN IMAGE FILES. PASS 1 IS FOR MIS02580
                C       LEFT SIDE OF SEGMENT. PASS 2 IS FOR RIGHT SIDE OF SEGEMENT   MIS02590
                C                                                                    MIS02600
ISN 0152                OFFSET=-98                                                   MIS02610
ISN 0153                DO 500 PASS=1,2                                              MIS02620
ISN 0154                OFFSET=OFFSET+98                                             MIS02630
ISN 0155                REWIND 9                                                     MIS02640
ISN 0156                REWIND 10                                                    MIS02650
                C                                                                    MIS02660
                C                                                                    MIS02670
                C        WRITE HEADING FOR MAP                                       MIS02680
                C                                                                    MIS02690
ISN 0157                WRITE (6,918) PASS, KLASEG                                   MIS02700
ISN 0158           918 FORMAT(1H1,10X,'PART ',I1,' OF COMPARISON MAP OF SEGMENT NUMBER', MIS02710
                      *I5)                                                           MIS02720
ISN 0159                WRITE(6,3020)GTRSEG,IYR,(GTDATE(I),I = 1,3),KLASEG,          MIS02730
                      & KYR,(K DATE(I),I = 1,3)                                      MIS02740
ISN 0160          3020 FORMAT( 1X,'GROUND TRUTH FILE =',11X,I4,I2,I1,I1,I1,5X,       MIS02750
                      *          'CLASSIFICATION FILE =',11X,I4,I2,I1,I1,I1//)       MIS02760
ISN 0161                IF(PASS.EQ.1) WRITE(6,919) (I,I=1,9)                         MIS02770
ISN 0163           919 FORMAT(1H ,10X,9I10)                                          MIS02780
ISN 0164                DO 11 I=1,10                                                 MIS02790
ISN 0165            11 PIXNUM(I)=I-1                                                 MIS02800
ISN 0166                IF (PASS.EQ.2) WRITE(6,920) (PIXNUM(I),I=1,10)               MIS02810
ISN 0168           920 FORMAT(1H ,2X,10I10)                                          MIS02820
                C                                                                    MIS02830
                C       READ HEADER RECORD.                                          MIS02840
                C                                                                    MIS02850
ISN 0169                READ(10,940) DUMMY                                           MIS02860
ISN 0170                READ(9,940) DUMMY                                            MIS02870
ISN 0171           940 FORMAT(1A4)                                                   MIS02880
                C                                                                    MIS02890
                C       READ COLOR RECORDS IF SKIP FLAG IS SET.                      MIS02900
                C                                                                    MIS02910
ISN 0172                IF(SKIP.EQ.0) GO TO 112                                      MIS02920
ISN 0174                DO 111 I=1,50                                                MIS02930
ISN 0175           111 READ (2,941) DUMMY                                            MIS02940
ISN 0176           941 FORMAT(1A50)                                                  MIS02950
                C                                                                    MIS02960
                C       READ THROUGH IMAGES ONE LINE AT A TIME FOR CLASSIFICATION FILE MIS02970
                C       AND THREE LINES AT A TIME FOR THE GROUND TRUTH FILE.         MIS02980
                C                                                                    MIS02990
ISN 0177           112 DO 400 LINE=1,117                                             MIS03000
                C                                                                    MIS03010
                C       READ CLASSIFICATION FILE.                                    MIS03020
                C       THE FIRST 72 BYTES CONTAIN THE NUMBER OF THE PHYSICAL RECORD AND MIS03030
                C       ANCILLARY DATA, FOLLOWED BY 196 BYTES (A VIDEO BLOCK), PLUS AN MIS03040
                C       ADJUSTMENT TO A MULTIPLE OF 180.                             MIS03050
                C                                                                    MIS03060
ISN 0178                READ(10,942) (ITBUF(I),I=1,360)                              MIS03070
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ISN 0179        942 FORMAT(2(180A1))                                                  MIS03080
              C                                                                       MIS03090
              C     READ GROUND TRUTH FILE INTO A 3X540 ARRAY.                        MIS03100
              C     FOR I = 1,3  J = 1,72, GTBUF(I,J) CONTAINS ANCILLARY DATA.        MIS03110
              C     GROUND TRUTH FILE CONTAINS 6 TIMES AS MUCH DATA AS THE            MIS03120
              C     CLASSIFICATION FILE.  SO, CORRESPONDING TO EACH VIDEO BLOCK (196  MIS03130
              C     BYTES) OF THE CLASSIFICATION FILE, THE GROUND TRUTH FILE IS TWICE MIS03140
              C     AS LONG AND THREE ROWS DEEP.                                      MIS03150
              C     SUBPIXEL DATA REQUIRE 2 COLUMNS AND 3 ROWS.                       MIS03160
              C     READ 72 CONTROL CHARACTERS + 2*196 ADJUSTED TO A MULTIPLE         MIS03170
              C     OF 180.                                                           MIS03180
              C                                                                       MIS03190
ISN 0180            DO 113 IREC=1,3                                                   MIS03200
ISN 0181        113 READ(9,943) (GTBUF(IREC,I),I=1,540)                               MIS03210
ISN 0182        943 FORMAT(3(180A1))                                                  MIS03220
              C                                                                       MIS03240
              C     SET OUTPUT ARRAY TO ALL "?".                                      MIS03250
              C                                                                       MIS03260
ISN 0183            DO 303 I=1,98                                                     MIS03270
ISN 0184        303 CHAR(I)=QCHAR                                                     MIS03280
              C                                                                       MIS03290
              C     MAKE COMPARISON ON PIXEL BY PIXEL BASIS.                          MIS03300
              C                                                                       MIS03310
ISN 0185            DO 300 SAMP=1,98                                                  MIS03320
              C                                                                       MIS03330
              C     DETERMINE CLASSIFICATION CODE.                                    MIS03340
              C                                                                       MIS03350
ISN 0186            SS=SAMP+72+OFFSET                                                 MIS03360
ISN 0187            X=DTBUF(SS)                                                       MIS03370
ISN 0188            DTCODE=DT(X)                                                      MIS03380
              C                                                                       MIS03390
              C     DETERMINE GROUND TRUTH CODE.                                      MIS03400
              C     GTBUF1 IS A 6X270 ARRAY EQUIVALENCED TO GTBUF.  THE CONTROL       MIS03410
              C     CHARACTERS ARE NOW STORED IN GTBUF1(I,J) FOR I = 1,6  J = 1,36    MIS03420
              C     AND SUBPIXEL DATA REQUIRE 1 COLUMN AND 6 ROWS.                    MIS03430
              C                                                                       MIS03440
ISN 0189            DO 114 SPIX=1,6                                                   MIS03450
ISN 0190            M=GTBUF1(SPIX,SAMP+OFFSET+36)                                     MIS03460
              C                                                                       MIS03470
              C     128 ADDED TO COMPENSATE FOR ADJUSTMENT MADE IN CARTO LAB          MIS03480
              C                                                                       MIS03490
ISN 0191            M=M+128                                                           MIS03500
ISN 0192            IF(M.GT.255) M=M-256                                              MIS03510
ISN 0194        114 MT(SPIX)=GT(M)                                                    MIS03520
              C                                                                       MIS03530
              C     DETERMINE MAJORITY RULE CODE FOR PIXEL.                           MIS03540
              C                                                                       MIS03550
ISN 0195            NC=0                                                              MIS03560
ISN 0196            DO 116 I=1,6                                                      MIS03570
ISN 0197            CC=MT(I)                                                          MIS03580
ISN 0198            N=0                                                               MIS03590
ISN 0199            DO 115 J=1,6                                                      MIS03600
ISN 0200        115 IF(CC.EQ.MT(J)) N=N+1                                             MIS03610
ISN 0202            IF(N.LE.NC) GO TO 116                                             MIS03620
ISN 0204            NC=N                                                              MIS03630
ISN 0205            GTCODE=CC                                                         MIS03640
ISN 0206            IF(NC.GE.3) GO TO 302                                             MIS03650
ISN 0208        116 CONTINUE                                                          MIS03660
ISN 0209        302 IF(NC.LT.NPURL.OR.NC.GT.NPURU) GO TO 300                          MIS03670
              C                                                                       MIS03680
              C     LOAD OUTPUT ARRAY WITH PROPER CHARACTER.                          MIS03690
              C                                                                       MIS03700
ISN 0211            RSUM(DTCODE,GTCODE)=RSUM(DTCODE,GTCODE)+1.                        MIS03710
ISN 0212            CHAR(SAMP)=SYM(DTCODE,GTCODE)                                     MIS03720
ISN 0213        300 CONTINUE                                                          MIS03730
              C                                                                       MIS03740
              C     PRINT OUT LINE.                                                   MIS03750
              C                                                                       MIS03760
ISN 0214            IF(MOD(LINE,10).EQ.0) GO TO 301                                   MIS03770
ISN 0216            WRITE(6,921) (CHAR(I),I=1,98)                                     MIS03780
ISN 0217        921 FORMAT(1H ,10X,98A1)                                              MIS03790
ISN 0218            GO TO 350                                                         MIS03800
ISN 0219        301 LINE1 = LINE/10                                                   MIS03810
ISN 0220            WRITE(6,922) (LINE1),(CHAR(I),I=1,98),(LINE1)                     MIS03820
ISN 0221        922 FORMAT(1H ,6X,I2,2X,98A1,2X,I2)                                   MIS03830
ISN 0222        350 IF(MOD(LINE,61).EQ.0) WRITE(6,950)                                MIS03840
ISN 0224        950 FORMAT(1H1,///)                                                   MIS03850
ISN 0225        400 CONTINUE                                                          MIS03860
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          C                                                                        MIS03870
          C     ONE PART OF THE MAP IS COMPLETE.                                   MIS03880
          C                                                                        MIS03890
ISN 0226        IF(PASS.EQ.1) WRITE(6,919) (I,I=1,9)                               MIS03900
ISN 0228        IF (PASS.EQ.2) WRITE(6,920)(PIANNU(I),I=1,10)                      MIS03910
ISN 0230    500 CONTINUE                                                           MIS03920
          C                                                                        MIS03930
          C     CLOSE THE IMAGE FILES.                                             MIS03940
          C                                                                        MIS03950
          C                                                                        MIS03960
          C     PRINT OUT SUMMARY OF COMPARISON.                                   MIS03970
          C                                                                        MIS03980
ISN 0231        RTOTI=0.                                                           MIS03990
ISN 0232        DO 1002 I=1,6                                                      MIS04000
ISN 0233        RTOT(I)=0.                                                         MIS04010
ISN 0234        DO 1001 J=1,6                                                      MIS04020
ISN 0235   1001 RTOT(I)=RTOT(I)+RSUM(I,J)                                          MIS04030
ISN 0236   1002 RTOTI=RTOTI+RTOT(I)                                                MIS04040
          C     WRITE TOTAL NUMBER OF PIXELS COMPARED                              MIS04050
ISN 0237        WRITE(6,3040)                                                      MIS04060
ISN 0238   3040 FORMAT(1H1,10X,'SUMMARY OF COMPARISION RESULTS')                   MIS04070
ISN 0239        WRITE(6,3050)GTRSEG,TYR,(GTDATE(I),I = 1,3)                        MIS04080
ISN 0240   3050 FORMAT(//,11X,'GROUND TRUTH FILE -',11X,I4,I2,I1,I1,I1)            MIS04090
ISN 0241        WRITE(6,3060)KLASEG,KYR,(KLDATE(I),I = 1,3)                        MIS04100
ISN 0242   3060 FORMAT(11X,'CLASSIFICATION FILE -',9X,I4,I2,I1,I1,I1)              MIS04110
ISN 0243        WRITE(6,939) RTOTI                                                 MIS04120
ISN 0244    939 FORMAT(1H0,10X,'NUMBER OF PIXELS CONSIDERED IN COMPARISON =',      MIS04130
               *F19.0//)                                                           MIS04140
          C                                                                        MIS04150
          C     PRINT HEADER FOR PERCENTAGES OF EACH 6 BY 6 CATAGORIES             MIS04160
          C                                                                        MIS04170
ISN 0245        WRITE(6,925) (I,I=1,6)                                             MIS04180
ISN 0246    925 FORMAT(1H0,10X,'PERCENTAGE OF SCENE IN EACH CATEGORY'//39X,        MIS04190
               *'GROUND TRUTH CATEGORIES'/28X,6(3X,'-',I1,'-'),2X,'TOTAL')         MIS04200
ISN 0247        DO 1003 I=1,2                                                      MIS04210
ISN 0248          DO 1003 J = 1, 6                                                 MIS04220
ISN 0249         RSUMP(I,J) = RSUM(I,J)*100./RTOTI                                 MIS04230
ISN 0250   1003  CONTINUE                                                          MIS04240
ISN 0251         DO 1010 I = 1,2                                                   MIS04250
ISN 0252         RTOTP(I) = RTOT(I)*100./RTOTI                                     MIS04260
          C                                                                        MIS04270
          C     WRITE PERCENTAGES AND SUM OF THEM FOR 1ST & 2ND                    MIS04280
          C     CLASSIFICATION CATAGORIES                                          MIS04290
          C                                                                        MIS04300
ISN 0253   1010 WRITE (6,926) I,(RSUMP(I,J), J=1,6), RTOTP(I)                      MIS04310
ISN 0254    926 FORMAT(1H0,26X,I1,'-',7F6.1)                                       MIS04320
ISN 0255          DO 1020 J=1,6                                                    MIS04330
ISN 0256         RSUMP(3,J)=RSUM(3,J)*100./RTOTI                                   MIS04340
ISN 0257   1020  CONTINUE                                                          MIS04350
ISN 0258         RTOTP(3)=RTOT(3) *100./RTOTI                                      MIS04360
          C                                                                        MIS04370
          C     WRITE PERCENTAGES AND SUM OF THEM FOR THE 3RD                      MIS04380
          C     CLASSIFICATION CATAGORY                                            MIS04390
          C                                                                        MIS04400
ISN 0259         WRITE(6,927) (RSUMP(3,J),J=1,6), RTOTP(3)                         MIS04410
ISN 0260    927 FORMAT(1H0,10X,'CLASSIFICATION  3-',7F6.1/11X,'CATEGORIES')        MIS04420
ISN 0261        DO 1004 I=4,6                                                      MIS04430
ISN 0262        RTOTP(I)= RTOT(I)*100./RTOTI                                       MIS04440
ISN 0263        DO 1004 J=1,6                                                      MIS04450
ISN 0264        RSUMP(I,J)=RSUM(I,J)*100./RTOTI                                    MIS04460
ISN 0265   1004 CONTINUE                                                           MIS04470
ISN 0266        DO 1030 I=4,6                                                      MIS04480
          C                                                                        MIS04490
          C     WRITE PERCENTAGES AND SUM OF THEM FOR 4TH, 5TH, 6TH                MIS04500
          C     CLASSIFICATION CATAGORIES                                          MIS04510
          C                                                                        MIS04520
ISN 0267   1030 WRITE(6,928) I, (RSUMP(I,J), J=1,6), RTOTP(I)                      MIS04530
ISN 0268    928 FORMAT(1H ,26X,I1,'-',7F6.1/)                                      MIS04540
          C                                                                        MIS04550
          C     CALCULATE TOTAL PERCENTAGES FOR 6 GROUND TRUTH CATAGORIES          MIS04560
          C                                                                        MIS04570
ISN 0269        DO 1006 J=1,6                                                      MIS04580
ISN 0270        RTOT(J)=0.                                                         MIS04590
ISN 0271        DO 1005 I=1,6                                                      MIS04600
ISN 0272   1005 RTOT(J)=RTOT(J)+RSUM(I,J)                                          MIS04610
ISN 0273   1006 CONTINUE                                                           MIS04620
ISN 0274        DO 1040 I=1,6                                                      MIS04630
ISN 0275        RTOTP(I)= RTOT(I)*100./RTOTI                                       MIS04640
                                                                                   MIS04650
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      ISN 0276      1040 CONTINUE                                                   MIS04660
                  C                                                                MIS04670
                  C      WRITE TOTAL PERCENTAGES FOR 6 GROUND TRUTH CATAGORIES     MIS04680
                  C                                                                MIS04690
      ISN 0277           WRITE(6,929) (RTOTP(I), I=1,6)                            MIS04700
      ISN 0278       929 FORMAT(1H ,23X,'TOTAL',6F6.1//)                           MIS04710
      ISN 0279           RTOT2=0.                                                  MIS04720
      ISN 0280           DO 1007 I=1,6                                             MIS04730
      ISN 0281      1007 RTOT2=RTOT2+RSUM(I,7)                                     MIS04740
                  C                                                                MIS04750
                  C      RDIFF IS (TOTAL PIXELS MINUS # PIXELS CLASSIFIED)/TOTAL PIX MIS04760
                  C                                                                MIS04770
      ISN 0282           RDIFF=(RTOT1-RTOT2)*100./RTOT1                            MIS04780
      ISN 0283           WRITE(6,930) RDIFF                                        MIS04790
      ISN 0284       930 FORMAT(1H0,10X,'PERCENTAGE OF SCENE MISCLASSIFIED= ', F6.1) MIS04800
                  C                                                                MIS04810
      ISN 0285      9000 STOP                                                      MIS04820
      ISN 0286           END                                                       MIS04830

                          *****F O R T R A N   C R O S S   R E F E R E N C E   L I S T I N G*****
SYMBOL    INTERNAL STATEMENT NUMBERS
I         0017 0018 0020 0021 0034 0035 0037 0038 0050 0051 0056 0056 0056 0060 0068 0068 0080 0080 0080
          0082 0082 0082 0084 0084 0084 0086 0087 0087 0091 0091 0091 0099 0100 0102 0105 0106 0114 0115
          0117 0119 0120 0124 0124 0124 0127 0127 0127 0129 0129 0129 0131 0131 0131 0133 0133 0133 0138
          0138 0138 0149 0151 0159 0159 0159 0159 0159 0159 0161 0161 0161 0164 0165 0165 0166 0166 0166
          0174 0178 0178 0178 0181 0181 0181 0183 0184 0196 0197 0216 0216 0216 0220 0220 0226 0226 0226
          0226 0228 0228 0228 0232 0233 0235 0235 0235 0236 0239 0239 0239 0241 0241 0241 0245 0245 0245
          0247 0249 0249 0251 0252 0252 0253 0253 0253 0261 0262 0262 0264 0264 0266 0267 0267 0267 0271
          0272 0274 0275 0275 0277 0277 0277 0280 0281 0281
J         0018 0018 0018 0087 0087 0087 0089 0089 0089 0091 0091 0091 0150 0151 0199 0200 0234 0235 0248
          0249 0249 0253 0253 0253 0255 0256 0256 0259 0259 0259 0263 0264 0264 0267 0267 0267 0269 0270
          0272 0272 0272
M         0190 0191 0191 0192 0192 0192 0194
N         0198 0200 0200 0202 0204
X         0187 0188
CC        0197 0200 0205
DT        0003 0034 0051 0112 0115 0119 0188
GT        0003 0021 0035 0097 0100 0105 0194
MI        0003 0194 0197 0200
NA        0022 0024 0026 0026 0028 0034 0039 0040 0042 0042 0044 0050 0098 0103 0106 0109 0113 0118 0120
          0123
NC        0195 0202 0204 0206 0209 0209
NE        0022 0024 0026 0026 0028 0034 0039 0040 0042 0042 0044 0050 0102 0103 0108 0109 0117 0118 0122
          0123
NO        0022 0024 0024 0032 0032 0032 0035 0039 0040 0044 0048 0048 0048 0051 0097 0100 0103 0105 0109
          0112 0115 0118 0119 0123
SS        0186 0187
MON       0005 0056 0058 0058 0059 0060 0061 0068 0071 0071 0072 0073 0074 0129 0131 0133 0138
KYR       0061 0063 0082 0127 0159 0241
LIN       0066 0068 0139
MOD       0214 0222
SYM       0005 0018 0087 0089 0091 0212
TYP       0074 0075 0080 0124 0159 0239
CHAR      0005 0184 0212 0216 0220
TFPR      0009 0016 0030 0046 0064 0076 0145 0147
IRFC      0180 0181
ISFG      0067 0069 0135
JERR      0063 0064 0075 0076
KDAY      0059 0063
KMON      0060 0063
LINE      0177 0214 0219 0222
NSMP      0055
PASS      0153 0157 0161 0166 0226 0228
RSUM      0003 0151 0211 0211 0235 0249 0256 0264 0272 0281
RTOT      0003 0233 0235 0235 0236 0252 0258 0262 0270 0272 0272 0275
SAMP      0185 0186 0190 0212
SKIP      0053 0172
SPIX      0189 0190 0194
TDAY      0072 0075
TMON      0073 0075
DTRUF     0005 0178 0187
DUMMY     0169 0170 0175
GTRUF     0005 0006 0191
ISTTF     0003
LINE1     0219 0220 0220
NPIXL     0010 0012 0012 0012 0014 0091 0209
NPIXU     0010 0012 0012 0012 0014 0091 0209
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                              *****F O R T R A N   C R O S S   R E F E R E N C E   L I S T I N G*****
   LABEL    DEFINED    REFERENCES
    935      0146       0138
    937      0011       0010
    938      0094       0093
    939      0244       0243
    940      0171       0169   0170
    941      0176       0175
    942      0179       0178
    943      0182       0181
    950      0224       0222
   1001      0235       0234
   1002      0236       0232
   1003      0250       0247   0248
   1004      0265       0261   0263
   1005      0272       0271
   1006      0273       0269
   1007      0281       0280
   1010      0253       0251
   1020      0257       0255
   1030      0267       0266
   1040      0276       0274
   2000      0015       0014
   2105      0029       0028
   2110      0032       0026
   2120      0045       0044
   2130      0048       0042
   2135      0057       0056   0060
   2140      0081       0080
   2145      0083       0082
   2150      0125       0124
   2180      0127       0069
   2185      0128       0127
   2190      0129       0126
   2195      0137       0135
   3000      0149       0067
   3005      0144       0143
   3010      0147       0141
   3020      0160       0159
   3040      0238       0237
   3050      0240       0239
   3060      0242       0241
   4000      0017       0012
   9000      0285       0147

                                                         /    MAIN /     SIZE OF PROGRAM 003A20 HEXADECIMAL BYTES

      NAME      TAG    TYPE   ADD.          NAME      TAG    TYPE   ADD.          NAME      TAG    TYPE   ADD.          NAME      TAG    TYPE   ADD.
         I SF          I*4    0007E4           J SF          I*4    0007E8           M SF          I*4    0007EC           N SF          I*4    0007F0
         K SF          I*4    0007F4          CC SF          I*4    0007F8          DT SF          I*4    001698          G  SF          I*4    001A94
        MT SF          I*4    001F90          DB SF          I*4    0007FC          NC S           I*4    000800          NE SF          I*4    000804
        MO SF          I*4    000808          SS SF          I*4    00080C         HOR SF          L*1    000A80         KYR SFA         I*4    000810
       LIN SF          I*4    000814         SYM SF          L*1    001474         TYR SFA         I*4    000818        CHAR SF          L*1    001498
      IERR S           I*4    00081C        IREC SF          I*4    000820        ISEG SF          I*4    000824        JERR SFA         I*4    000828
      KDAY SFA         I*4    00082C        KMON SFA         I*4    000830        LINE SFA         I*4    000834        MSMP SF   XF            000000
      PASS SF          I*4    000834        PSUM SF          R*4    001EA8        RTOT SF          R*4    001F38        SAMP SF          I*4    00083C
      SKIP S           I*4    000840        SPIX SF          I*4    000844        TDAY SFA         I*4    000848        TMON SFA         I*4    00084C
     DTBUF SF          L*1    0014FA       DUMMY S           I*4    000850       GTBUF S      E    L*1    002038       ISITE             I*4      NR
     LINE1 SF          I*4    000854       NPURL SF          I*4    000858      NPIXEL SF          I*4    00085C       OCHAR  F         L*1    0007E0
     RDIFF SF          R*4    000860       PSUMP SF          R*4    001F50       RTOTP SF          R*4    001FE0       RTOT1 SF          R*4    000864
     RTOT2 SF          R*4    000868      DTCODE SF          I*4    00086C      DTFLNM             L*1    001662      GTBUF1  F     E   L*1    00203A
    GTCODE SF          I*4    000870      GTDATE SFA         I*4    001FF8      GTFLNM             L*1    00167C      GTRSEG SF          I*4    000874
    IRCODE  F   XF     I*4    000000       MULTA SF   XF            000000      KLASEG SF          I*4    000878      KLDATE SFA         I*4    002004
    OFFSET SF          I*4    00087C      PIXNUM SF          I*4    002010

SOURCE STATEMENT LABELS

    LABEL   ISN   ADDR             LABEL   ISN   ADDR             LABEL   ISN   ADDR             LABEL   ISN   ADDR
     4000    17   0027E0               1    18   0027E4               2    21   002824               3    22   002942
     2110    32   0028EC               4    35   002908               5    37   00292E               6    38   002932
        7    39   002950            2130    48   0029EA               8    51   002A14               9    53   002A3A
      117    87   002C2C             109   107   002D7C             110   121   002E50            2140   127   002ED4
     2190   129   002F0C             122   138   002F46            1000   140   002F04            3010   147   00301C
      118   151   00312F              11   165   00314C             111   175   0031EE             112   177   00321F
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*LEVEL 2.3.0 (JUNE 78)            MAIN          OS/360  FORTRAN H EXTENDED          DATE 81.139/13.25.58        PAGE  10
     113   181   003250            301   184   003292            114   194   003310            115   200   00335E
     116   208   0033A6            302   209   [illegible]       303   213   003416            361   219   003468
     150   222   003440            400   225   0034D8            500   230   00355C           1001   235   00358C
    1002   236   0035C0           1003   250   0035EC           1010   253   00372E           1020   257   0037AA
    1004   265   00384F           1030   267   003872           1005   272   0038E2           1056   271   00391C
    1040   276   003944           1007   281   003990           9000   285   0039F0

   COMPILER GENERATED LABELS

    LABEL   ISN    ADDR            LABEL   ISN    ADDR            LABEL   ISN    ADDR            LABEL   ISN    ADDR
   100000     1   00271C          100001    14   002788          100004    19   002820          200001    25   002874
   200002    25   002884          100006    26   00288F          200003    27   002896          200004    27   0028A2
   200005    27   0028AA          100007    28   0028B6          200006    33   0028F4          100008    33   0028FC
   100009    34   002900          100010    36   00292A          200007    41   002986          200008    41   002990
   100012    42   002994          200009    43   0029A2          200010    43   0029AE          200011    43   0029B6
   100013    44   0029C2          200012    49   002A00          100014    49   002A08          100015    50   002A0C
   100016    52   002A36          100019    65   002AE0          100020    66   002AF4          100021    68   002AF0
   100024    71   002B24          100025    77   002B70          100026    78   002B74          100031    84   002C0C
   100032    84   002C24          100035    88   002C72          100042   100   002D18          100043   102   002D2C
   100044   106   002D8F          100045   115   002DEC          100046   117   002F00          100047   122   002F62
   100058   136   002F90          100061   141   002FE6          100062   143   002FF2          100063   149   003028
   100054   150   00302C          100065   152   00304E          100066   152   00305F          100067   154   00306C
   100072   162   00311A          100073   162   00312C          100074   162   003146          100075   164   00314A
   100076   166   003172          100077   167   00317E          100080   169   0031A8          100081   174   0031EA
   100083   178   003222          100088   182   00328F          100089   185   003282          100090   186   0032B6
   100091   190   0032F0          100092   193   003308          100093   195   003338          100094   197   003344
   100095   201   003370          100096   202   00337A          100097   202   003382          100098   204   00338E
   200013   210   0033C2          100100   211   0033CF          100101   214   003428          100102   216   00343A
   100107   223   0034C2          100104   226   0034FA          100109   227   0034F2          100110   227   003508
   100111   227   003522          100112   228   003526          100113   229   003572          100116   231   00356E
   100117   233   00357A          100114   237   0035F4          100124   245   00369A          100125   245   0036B2
   100126   248   00368A          100127   249   00368C          100128   251   0036F6          100129   251   00370A
   100130   252   00370F          100133   254   00374C          100134   256   0037AE          100135   258   0037B4
   100138   262   0037FC          100139   264   00381F          100140   266   003858          100141   266   00386A
   100144   268   0038CF          100145   270   0038D0          100147   274   003926          100148   275   00392A
   100149   277   00395C          100152   282   0039C0

   FORMAT STATEMENT LABELS

    LABEL   ISN    ADDR            LABEL   ISN    ADDR            LABEL   ISN    ADDR            LABEL   ISN    ADDR
      937    11   000028            2000    15   000030             900    19   00005C             901    23   000062
     2105    29   00006A            2120    45   0000A5             902    54   0000D8            2135    57   0000DF
      910    74   0000EA            2140    81   00012C            2145    83   000153             911    85   000198
      912    88   0001CA             913    90   0001E5             914    92   00021B             938    94   00025E
      915    96   000249             916   104   0002BF             917   111   0002D7            2150   125   0002FF
     2185   128   000330             932   130   000374             933   132   000397             934   134   00038F
     2195   137   0003F3            3005   144   0003F6             935   146   00042E             918   158   00044E
     3020   160   000486             919   163   000402             920   168   000490             940   171   0004EA
      941   176   0004EC             942   179   0004F0             943   182   0004F9             921   217   000502
      922   221   00050D             958   224   000520            3040   238   00052A            3050   240   00054F
     3060   242   000576             939   244   000590             925   246   0005D6             926   254   000639
      927   260   00064A             928   268   000579             923   278   0006A8             930   284   0006A0

*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS*     SOURCE STATEMENTS =      285, PROGRAM SIZE =     14880, SUBPROGRAM NAME =  MAIN

*STATISTICS*  NO  DIAGNOSTICS GENERATED

****** END OF COMPILATION ******                                         216K BYTES OF CORE NOT USED
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*LEVEL 2.3.0 (JUNE 78)                  OS/360  FORTRAN H EXTENDED              DATE 81.141/13.12.17        PAGE   1
REQUESTED OPTIONS: NOTERM
OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
                   SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
    ISN 0002              SUBROUTINE JULIAN (JDATE,INERR,INDAY,INMNTH,INYEAR)                      JUL00010
                    C                                                                              JUL00020
                    C                                                                              JUL00030
                    C   PURPOSE:  TO CONVERT STANDARD DAY AND MONTH TO JULIAN DATE                 JUL00040
                    C                                                                              JUL00050
                    C                                                                              JUL00060
                    C   HISTORY:                                                                   JUL00070
                    C     J C CRISP        LEMSCO    02/09/81    ORIGINAL CODE                     JUL00080
                    C                                                                              JUL00090
                    C                                                                              JUL00100
                    C   DESCRIPTION OF ARGUMENTS:                                                  JUL00110
                    C     JDATE--ARRAY TO RETURN JULIAN DATE (1 DIGIT PER ARRAY ELEMENT)           JUL00120
                    C     INERR--ERROR FLAG INDICATING INPUT VALUE OUT OF RANGE (ZERO              JUL00130
                    C            RETURNED IF NO ERROR OCCURS)                                      JUL00140
                    C     INDAY--DAY OF MONTH                                                      JUL00150
                    C     INMNTH--MONTH OF YEAR AS INTEGER                                         JUL00160
                    C     INYEAR--LAST TWO DIGITS OF YEAR                                          JUL00170
                    C                                                                              JUL00180
                    C                                                                              JUL00190
                    C   DESCRIPTION OF VARIABLES:                                                  JUL00200
                    C     JTEMP--TEMPORARY STORAGE FOR JULIAN DATE                                 JUL00210
                    C                                                                              JUL00220
                    C                                                                              JUL00230
                    C                                                                              JUL00240
    ISN 0003              DIMENSION JDATE (3)                                                      JUL00250
                    C                                                                              JUL00260
                    C                                                                              JUL00270
                    C CHECK FOR INPUT VALUE OUT OF RANGE                                           JUL00280
                    C                                                                              JUL00290
    ISN 0004              IF ((INDAY.LT.1).OR.(INDAY.GT.31)) GO TO 800                             JUL00300
    ISN 0006              IF ((INMNTH.LT.1).OR.(INMNTH.GT.12)) GO TO 800                           JUL00310
                    C                                                                              JUL00320
                    C                                                                              JUL00330
                    C DETERMINE JULIAN DATE FOR INPUT MONTH                                        JUL00340
                    C                                                                              JUL00350
    ISN 0008                IF ((INMNTH.EQ.1)  JTEMP=0                                             JUL00360
    ISN 0010                IF ((INMNTH.EQ.2)  JTEMP=31                                            JUL00370
    ISN 0012                IF ((INMNTH.EQ.3)  JTEMP=59                                            JUL00380
    ISN 0014                IF ((INMNTH.EQ.4)  JTEMP=90                                            JUL00390
    ISN 0016                IF ((INMNTH.EQ.5)  JTEMP=120                                           JUL00400
    ISN 0018                IF ((INMNTH.EQ.6)  JTEMP=151                                           JUL00410
    ISN 0020                IF ((INMNTH.EQ.7)  JTEMP=181                                           JUL00420
    ISN 0022                IF ((INMNTH.EQ.8)  JTEMP=212                                           JUL00430
    ISN 0024                IF ((INMNTH.EQ.9)  JTEMP=243                                           JUL00440
    ISN 0026                IF ((INMNTH.EQ.10)  JTEMP=273                                          JUL00450
    ISN 0028                IF ((INMNTH.EQ.11)  JTEMP=304                                          JUL00460
    ISN 0030                IF ((INMNTH.EQ.12)  JTEMP=334                                          JUL00470
    ISN 0032                JTEMP=JTEMP+INDAY                                                      JUL00480
                    C                                                                              JUL00490
                    C                                                                              JUL00500
                    C CHECK FOR LEAP YEAR AND ADD ONE DAY IF MONTH IS 3 OR GREATER                 JUL00510
                    C                                                                              JUL00520
    ISN 0033                IF ((INMNTH.GE.3).AND.(MOD(INYEAR,4).EQ.0)) JTEMP=JTEMP+1              JUL00530
                    C                                                                              JUL00540
                    C                                                                              JUL00550
                    C STORE DATE IN ARRAY, ONE DIGIT PER ARRAY ELEMENT                             JUL00560
                    C                                                                              JUL00570
    ISN 0035                JDATE(1)=JTEMP/100                                                     JUL00580
    ISN 0036                JDATE(2)=(JTEMP-((JTEMP/100)*100))/10                                  JUL00590
    ISN 0037                JDATE(3)=JTEMP-((JTEMP/10)*10)                                         JUL00600
    ISN 0038                INERR=0                                                                JUL00610
    ISN 0039                GO TO 900                                                              JUL00620
                    C                                                                              JUL00630
                    C                                                                              JUL00640
                    C INPUT ERROR                                                                  JUL00650
                    C                                                                              JUL00660
    ISN 0040          800 INERR=1                                                                  JUL00670
                    C                                                                              JUL00680
                    C                                                                              JUL00690
    ISN 0041          900 RETURN                                                                   JUL00700
    ISN 0042              END                                                                      JUL00710
```

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*LEVEL 2.3.0 (JUNE 78)          JULIAN          OS/360  FORTRAN H EXTENDED           DATE 81.141/10.12.17        PAGE   2
                                 *****F O R T R A N    C R O S S    R E F E R E N C E    L I S T I N G*****
SYMBOL   INTERNAL STATEMENT NUMBERS
MOD      0033
INDAY    0002   0004   0004   0032
INERR    0002   0038   0040
JDATE    0002   0003   0035   0036   0037
JTEMP    0008   0010   0012   0014   0016   0018   0020   0022   0024   0026   0028   0030   0032   0032   0033   0033   0035   0036   0036
         0037   0037
INMNTH   0002   0006   0006   0008   0010   0012   0014   0016   0018   0020   0022   0024   0026   0028   0030   0033
INYEAR   0002   0033
JULIAN   0002

                                 *****F O R T R A N    C R O S S    R E F E R E N C E    L I S T I N G*****
 LABEL     DEFINED     REFERENCES
  800      0040        0004   0006
  900      0041        0039

                                                                 /   JULIAN /     SIZE OF PROGRAM 000300 HEXADECIMAL BYTES

      NAME      TAG    TYPE   ADD.          NAME     TAG    TYPE   ADD.         NAME     TAG    TYPE   ADD.        NAME      TAG    TYPE   ADD.
     INDAY   F         I*4    0000E4       INERR S          I*4    0000E8       JDATE S   XR     I*4    0000E0      JTEMP SF         I*4    0000EC
    INMNTH             I*     0000F0      INYEAR     A      I*4    0000F4      JULIAN            I*4    0000F8

  SOURCE STATEMENT LABELS

    LABEL   ISN   ADDR              LABEL   ISN   ADDR              LABEL   ISN    ADDR             LABEL   ISN    ADDR
     800     40   00027E             900     41   000282

  COMPILER GENERATED LABELS

    LABEL   ISN   ADDR              LABEL   ISN   ADDR              LABEL   ISN    ADDR             LABEL   ISN    ADDR
   100001     2   000110           100002     6   000148           100003     8    00016A          100004     9    000170
   100005    10   000174           100006    11   00017C           100007    12    000180          100008    13    000188
   100009    14   00018C           100010    15   000194           100011    16    000198          100012    17    0001A0
   100013    18   0001A4           100014    19   0001AC           100015    20    0001B0          100016    21    0001B8
   100017    22   0001BC           100018    23   0001C4           100019    24    0001C8          100020    25    0001D0
   100021    26   0001D4           100022    27   0001DC           100023    28    0001E0          100024    29    0001E8
   100025    30   0001EC           100026    31   0001F4           100027    32    0001F8          100028    34    00022C
   100029    35   00022E
*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
*STATISTICS*     SOURCE STATEMENTS =       41, PROGRAM SIZE =       768, SUBPROGRAM NAME =JULIAN
*STATISTICS*  NO  DIAGNOSTICS GENERATED
****** END OF (    LATION ******                                        296K BYTES OF CORE NOT USED
```

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*LEVEL 2.3.0 (JUNE 78)                       OS/360  FORTRAN H EXTENDED                DATE 81.139/13.26.18          PAGE   1
REQUESTED OPTIONS: NOTERM
OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
                   SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
   ISN 0002               SUBROUTINE MSMP                                                           MSM00010
                   C   THIS SUBROUTINE READS THE USER'S INPUT FILE, AND PRINT                       MSM00020
                   C   THEM OUT. ALSO CALL CPTIME FOR  THE CURRENT TIME                             MSM00030
                   C   ORIGINATED BY PAT BROWN & DONALD CHENG, LEMSCO 12/24/80                      MSM00040
   ISN 0003               INTEGER ACARD(20)                                                         MSM00050
                   C                                                                                MSM00060
                   C   ACARD IS 80 COLUMN CHARACTERS ARRAY FOR USER'S INPUT FILE                    MSM00070
                   C                                                                                MSM00080
   ISN 0004               INTEGER*2 HMS(3)                                                          MSM00090
                   C                                                                                MSM00100
                   C   HMS IS HOURS, MINUTES AND SECONDS, DATE IS CURRENT DATE                      MSM00110
                   C                                                                                MSM00120
   ISN 0005               INTEGER*4 DATE(2)                                                         MSM00130
   ISN 0006               WRITE(6,800)                                                              MSM00140
   ISN 0007          800  FORMAT(1H1,//' INPUT SUMMARY'//)                                          MSM00150
                   C   READ CARD, PRINT CARD ON SUMMARY                                             MSM00160
                   C   READ UNTIL END OF FILE                                                       MSM00170
   ISN 0008           10  READ(21,999,END=99) (ACARD(I),I=1,20)                                     MSM00180
   ISN 0009          999  FORMAT(20A4)                                                              MSM00190
   ISN 0010               WRITE (6,998) (ACARD(I),I=1,20)                                           MSM00200
   ISN 0011          998  FORMAT (1X,20A4)                                                          MSM00210
   ISN 0012               GO TO 10                                                                  MSM00220
   ISN 0013           99  CALL CPTIME(DATE, HMS, TT,VT)                                             MSM00230
   ISN 0014               WRITE(6,1011)(DATE(I),I=1,2),(HMS(J),J=1,3)                               MSM00240
   ISN 0015         1011  FORMAT(1H1,//,' JOB INITIATED ON ',2A4,' AT ',I2,':',I2,':',I2)           MSM00250
   ISN 0016               RETURN                                                                    MSM00260
   ISN 0017               END                                                                       MSM00270

                                 *****F O R T R A N   C R O S S   R E F E R E N C E   L I S T I N G*****
SYMBOL  INTERNAL STATEMENT NUMBERS
I        0008  0006  0006  0010  0010  0010  0014  0014  0014
J        0014  0014  0014
TT       0013
VT       0013
HMS      0004  0013  0014
DATE     0005  0013  0014
MSMP     0002
ACARD    0003  0008  0010
CPTIME   0013

                                 *****F O R T R A N   C R O S S   R E F E R E N C E   L I S T I N G*****
 LABEL    DEFINED    REFERENCES
   10      0008       0012
   99      0013       0008
  800      0007       0006
  998      0011       0010
  999      0009       0008
 1011      0015       0014

                                                   /     MSMP /     SIZE OF PROGRAM 00024F HEXADECIMAL BYTES

       NAME     TAG    TYPE   ADD.          NAME     TAG    TYPE   ADD.          NAME    TAG    TYPE   ADD.          NAME    TAG    TYPE   ADD.
          I  F         I*4    0000F8           J  F         I*4    0000FC           TT SFA      R*4    000100           VT SFA      R*4    000104
        HMS SFA        I*2    00010C        DATE SFA        I*4    000114         MSMP          I*4    000108        ACARD SF       I*4    00011C
     CPTIME SF   XF           000000      IHCOM#  F   XF    I*4    000000

  SOURCE STATEMENT LABELS

    LABEL  ISN   ADDR            LABEL  ISN   ADDR             LABEL  ISN   ADDR            LABEL  ISN   ADDR
      10     8  000190              99   13  0001E8

  COMPILER GENERATED LABELS

    LABEL  ISN   ADDR            LABEL  ISN   ADDR             LABEL  ISN   ADDR            LABEL  ISN   ADDR
   100001    2  00017C          100002    8  0001A4

  FORMAT STATEMENT LABELS

    LABEL  ISN   ADDR            LABEL  ISN   ADDR             LABEL  ISN   ADDR            LABEL  ISN   ADDR
```

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*LEVEL 2.3.0 (JUNE 78)          MSMP          OS/360  FORTRAN H EXTENDED          DATE 81.139/13.26.18       PAGE   2
      800    7  00002A              999    9  000031            978    11  000047           1011   15  00004F
*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
*STATISTICS*     SOURCE STATEMENTS =       16, PROGRAM SIZE =       590, SUBPROGRAM NAME =  MSMP
*STATISTICS*  NO  DIAGNOSTICS GENERATED
****** END OF COMPILATION ******                                        288K BYTES OF CORE NOT USED
```

APPENDIX B

JOB CONTROL SOFTWARE

```
   &CONTROL OFF
*
*
* MISMAP EXEC
* -----------
*
*
* HISTORY
* -------
*
*    MARY TOMPKINS     LEMSCO      02/09/81      ORIGINAL CODE
*
*
* PURPOSE
* -------
*
*
*    THIS EXEC EXCUTES THE MISMAP PROGRAM.
*
*    ARGUMENTS TO THIS EXEC ARE:
*    SYMBOL FILE NAME     SYMBOL FILE TYPE
*
*    FILE DEFINITION DESCRIPTION FOR ALL FILES USED IN BADHWAR
*    PROGRAMS AND EXECS ARE AS FOLLOWS:
*          UNIT                  DESCRIPTION
*           2-4                  BADHWAR SYSTEM
*           5                    TERMINAL - WRITE
*           6                    PRINTER FILE STORED IN FILE OUT LISTING
*           7-8                  BADHWAR SYSTEM
*           9                    GROUND TRUTH (MUST BE DEFINED PREVIOUSLY)
*          10                    CLASS FILE  (MUST BE DEFINED PREVIOUSLY)
*          11                    BADHWAR SYSTEM
*          12-18                 BADHWAR SYSTEM
*          19                    SYMBOL FILE STORED IN &1 &2 A
*          20                    BADHWAR SYSTEM
*          21                    USER DEFINED FILE STORED IN MSMP CC A
*          22                    GT FILE RECALL FILE
*          23                    CLASS FILE RECALL FILE
*          24-28                 BADHWAR SYSTEM
*          30                    REREAD UNIT
*
*    NOTE THOSE FILES USED BY BADHWAR SYSTEM CAN BE USED IN THIS
*    PROGRAM. THIS IS JUST A WARNING THAT ONE SHOULD BE CAREFUL BEFORE
*    DOING SO IF HE INTENDS TO MAKE A BADHWAR SYSTEM RUN.
*
*
* EXCEPTION
* ----------
*
*    THE FOLLOWING ERRORS CAUSE PROGRAM TERMINATION:
*
*        1. NO TEMPORARY DISK ASSIGNED.
*        2. INSUFFICIENT PARAMETERS INPUT TO PROGRAM
*        3. GROUND TRUTH/CLASS FILE NOT DEFINED.
*
*
* PROCEDURE
* ---------
*
*
* ASSIGN PRINTER, SPECIFY LIBRARIES
*
    &IFERR = 0
    &SPACE 3
    &TYPE MISMAP &1 &2
    TAG DEV PRINTER HOUSTON
    SPOOL PRINTER CONT NOHOLD TO RSCS
*
*
* CHECK TO SEE IF TEMPORARY DISK IS ASSIGNED
*
    CP QUERY VIRTUAL 192
    &IF &RETCODE EQ 0 &GOTO -TRUE
    &TYPE GROUND TRUTH / CLASS FILE NOT YET DEFINED.
    &IFERR = 1
-TRUE
*
*
* CHECK FOR ACCEPTABLE PARAMETERS
```

```
*
     &IF &INDEX EQ 2 &GOTO -CONT
     &TYPE TOO MANY-TOO FEW INPUTS
     &IERR = 1
-CONT &IF &IERR EQ 1 &EXIT 1
*
*
* ISSUE FILEDEFS
*
     FILEDEF FT02F001 DISK GTCLINE EXEC D (LRECL 80 BLKSIZE 80 PERM
     FILEDEF 5 TERMINAL (PERM
     FILEDEF FT06F001 DISK OUT LISTING D(PERM
     FILEDEF FT19F001 DISK &1 &2 A(PERM LRECL 80 BLKSIZE 80
     FILEDEF FT21F001 DISK MSMP CC A(PERM LRECL 80 BLKSIZE 80
     FILEDEF FT22F001 DISK FLGTRU FILE D(LRECL 80 BLKSIZE 80 PERM
     FILEDEF FT23F001 DISK FLCLAS FILE D(LRECL 80 BLKSIZE 80 PERM
*
*
* RECALL FILE INFO ON GT AND CLASS FILE
*
     LOAD FILRCALL(CLEAR NOMAP START
*
*
* LOAD EXEC TO FILE DEF GT AND CLASS FILE
*
     EXEC GTCLINE D
     &READ VARS &IERROR
     &IF &IERROR EQ 1 &EXIT 2
*
*
* LOAD MAIN PROGRAM
*
     LOAD MISMAP(NOMAP CLEAR START
*
*
* CLOSE FILE PRINT FILES
*
     PRINT OUT LISTING D
     SPOOL PRINTER CLOSE
     &EXIT
&END
```

```
    &CONTROL OFF
*
* DEFCLAS
* -------
*
*
* HISTORY
* -------
*
*   M A TOMPKINS     LEMSCO      02/04/81     ORIGINAL CODE
*
*
* PURPOSE
* -------
*
*   THIS EXEC IS USED TO DEFINE CLASSIFICATION/CLUSTER FILES.
*
*   FILENAME FILETYPE FILEMODE OF CLASS FILE OR WRITTEN
*   ON A RECALL FILE (UNIT 23) BY FORTRAN ROUTINE FILWRT.
*   ARGUMENTS TO THE EXEC ARE AS FOLLOWS:
*
*
*   FOR SEGMENT ON DATA FILE:
*      FILENAME FILETYPE FILEMODE
*   FOR SEGMENT ON TAPE:
*      TAPE# FILE# TAPEDENSITY
*
*
*   FILE DEFINITION DESCRIPTION FOR ALL FILES USED IN THESE PROGRAMS
*   AND EXECS ARE AS FOLLOWS:
*         UNIT                   DESCRIPTION
*          2                     GTRUINFO
*          3                     TERMINAL: READ
*          4                     LARS GTRUINF
*          5                     TERMINAL: WRITE LARS ERROR MSG ROUTINE
*          6                     BADHWAR SYSTEM
*          7                     BADHWAR SYSTEM
*          8                     BADHWAR SYSTEM
*          9                     BADHWAR SYSTEM
*         10                     CLASSIFICATION/CLUSTER FILE
*         11 - 19                BADHWAR SYSTEM
*         21                     BADHWAR SYSTEM
*         22                     BADHWAR SYSTEM
*         23                     RECALL FILE FOR CLASS FILE
*         24-28                  BADHWAR SYSTEM
*         30                     REREAD UNIT
*
*   NOTE: THOSE FILES USED BY BADHWAR SYSTEM CAN BE USED IN THIS
*   PROGRAM THIS IS JUST A WARNING THAT ONE SHOULD BE CAREFUL BEFORE
*   DOING SO.
*
*
* EXCEPTION
* ---------
*
*   THE FOLLOWING ERRORS CAUSE PROGRAM TERMINATION:
*
*      1. NO TEMPORARY DISK AVAILABLE.
*      2. INSUFFICIENT PARAMETERS INPUT TO PROGRAM
*      3. ERROR IN ACCESSING LARS DATA BASE
*
*
* PROCEDURE
* ---------
*
*
* ASSIGN A TEMP DISK, SPECIFY LIBRARIES
*
    &SPACE 3
    &TYPE DEFCLAS &1 &2 &3
    GLOBAL TXTLIB CMSLIB FORTMOD2
    CP QUERY VIRTUAL 192
    &IF &RETCODE NE 0 GETDISK TEMP  2M CLEAR
    &IF &RETCODE NE 0 &TYPE NO TEMP DISK ACCESSED.
    &IF &RETCODE NE 0 &EXIT 1
*
*
*   STACK UNIT NUMBER AND FILEDEF RECALL UNIT
```

```
*
     &STACK 10
     FILEDEF 3 TERM(PERM
     FILEDEF FT23F001 DISK FLCLAS FILE D(LRECL 80 BLKSIZE 80 PERM
*
*
* CHECK FOR ACCEPTABLE PARAMETER COUNT AND DETERMINE INPUT
* OPTION
*
     &IF &INDEX EQ 3 &GOTO -TRUE
     &TYPE TOO MANY-TOO FEW INPUTS
     &EXIT 2
*
*
-TRUE
     &IF &3 EQ 1600 &GOTO -TAPE
     &IF &3 EQ  800 &GOTO -TAPE
     &TEST = &DATATYPE &3
     &IF &TEST EQ NUM &TYPE INPUTS NOT CORRECT
     &IF &TEST EQ NUM &EXIT 3
*
*
* DATA IS ON DISK
*
 FILEDEF FT10F001 DISK &1 &2 &3( LRECL 3168 BLOCK 3168 PERM RECFM U
     &STACK &1
     &STACK &2
     &STACK &3
     LOAD FILWRT (CLEAR NOMAP START
     &EXIT 4
*
*
* DATA IS ON TAPE
*
-TAPE &NAME = &CONCAT &1 &2
     TAPMOUNT &1 TAP1 RO &3
     TAPE REW (TAP1)
     &SK = &2 - 1
     &IF &SK EQ 0 &SKIP 1
     TAPE FSF &SK
     FILEDEF INMOVE TAP1(LRECL 3168 BLOCK 3168 RECFM U PERM DEN &3
     FILEDEF OUTMOVE DISK &NAME CLA D(LRECL 3168 BLOCK 3168 RECFM U PERM
     MOVEFILE
     DETACH 181
     FILEDEF FT10F001 DISK &NAME CLA D(LRECL 3168 BLOCK 3168 RECFM U PERM
     &STACK &NAME
     &STACK CLA
     &STACK D
     LOAD FILWRT(CLEAR NOMAP START
     &EXIT
&END
```

```
   &CONTROL OFF
*
*
* DEFGTRU EXEC
* ------------
*
*
* HISTORY
* -------
*
*    M A TOMPKINS      LEMSCO      02/04/81      ORIGINAL CODE
*
*
* PURPOSE
* -------
*
*    THIS EXEC EXECUTES A FORTRAN PROGRAM (GTRUINF) WHICH ACCESSES
*    THE LARS RTAE DATA BASE FOR INFO ON REQUESTED GROUND TRUTH TAPES
*    GTRUINF WRITES AN EXEC (GTRUINFO) WHICH TRANSMITS TO THIS EXEC
*    THE TAPE# FILE# OF TAPE THAT CONTAINS THE REQUESTED SEGMENT.
*    IN ADDITION THE FILENAME,FILETYPE,FILEMODE, AND UNIT 9 ARE
*    ARE PASSED TO PROGRAM FILWRT WHICH WRITES THIS INFO TO A FILE
*    DEFINED TO UNIT 22.
*
*    ARGUMENTS TO THE EXEC ARE AS FOLLOWS:
*
*    FOR SEGMENT ON DATA FILE:
*       FILENAME FILETYPE FILEMODE
*    FOR SEGMENT ON TAPE:
*       TAPE# FILE# TAPEDENSITY
*    FOR SEGMENT AT LARS:
*       SEGMENT# YEAR  (YEAR IS THE LAST 2 DIGITS OF THE YEAR OF SEGMENT)
*
*
*    FILE DEFINITION DESCRIPTION FOR ALL FILES USED IN THESE PROGRAMS
*    AND EXECS ARE AS FOLLOWS:
*            UNIT                      DESCRIPTION
*              2                       GTRUINFO
*              3                       TERMINAL: READ
*              4                       LARS GTRUINF
*              5                       TERMINAL: WRITE LARS ERROR MSG ROUTINE
*              6                       HARDWAR SYSTEM
*              7                       HARDWAR SYSTEM
*              8                       HARDWAR SYSTEM
*              9                       GROUND TRUTH FILES
*             10                       HARDWAR SYSTEM
*             11 - 19                  HARDWAR SYSTEM
*             21                       HARDWAR SYSTEM
*             22                       GROUND TRUTH FILE INFO
*             23                       HARDWAR SYSTEM
*             24-28                    HARDWAR SYSTEM
*             30                       REREAD UNIT
*
*    NOTE: THOSE FILES USED BY HARDWAR SYSTEM CAN BE USED IN THIS
*    PROGRAM THIS IS JUST A WARNING THAT ONE SHOULD BE CAREFUL BEFORE
*    DOING SO.
*
*
* EXCEPTION
* ---------
*
*    THE FOLLOWING ERRORS CAUSE PROGRAM TERMINATION:
*
*       1. NO TEMPORARY DISK AVAILABLE.
*       2. INSUFFICIENT PARAMETERS INPUT TO PROGRAM
*       3. 3RD INPUT NOT AS EXPECTED
*       4. ERROR IN ACCESSING LARS DATA BASE
*
*
* PROCEDURE
* ---------
*
*
* ASSIGN A TEMP DISK, SPECIFY LIBRARIES
*
   &SPACE 1
   &TYPE DEFGTRU &1 &2 &3
   GLOBAL TXTLIB CMSLIB FORTMOD2
   CP QUERY VIRTUAL 192
```

```
      &IF &RETCODE NE 0 GETDISK TEMP 2M CLEAR
      &IF &RETCODE NE 0 &TYPE NO TEMP DISK ACCESSED.
      &IF &RETCODE NE 0 &EXIT 1
*
*
* ISSUE FILEDEFS FOR FILWRT FORTRAN PROGRAM
* CHECK FOR ACCEPTABLE PARAMETER COUNT AND DETERMINE INPUT
* OPTION
*
      FILEDEF 3 TERM(PERM
      FILEDEF FT22F001 DISK FLGTRU FILE D(LRECL 80 BLKSIZE 80 PERM
      &IF &INDEX LT 2 &GOTO -NO
      &IF &INDEX LE 3 &GOTO -TRUE
-NO   &TYPE TOO MANY-TOO FEW INPUTS
      &EXIT 2
*
*
-TRUE &UNIT = 09
      &IF &INDEX EQ 2 &GOTO -LARS
      &IF &3 EQ 1600 &GOTO -TAPE
      &IF &3 EQ  800 &GOTO -TAPE
      &TEST = &DATATYPE &3
      &IF &TEST EQ NUM &TYPE INPUTS NOT CORRECT
      &IF &TEST EQ NUM &EXIT 3
*
*
* DATA IS ON DISK
*
 FILEDEF FT09F001 DISK &1 &2 &3( LRECL 3060 BLOCK 3060 PERM RECFM U
      &STACK &UNIT
      &STACK &1
      &STACK &2
      &STACK &3
      LOAD FILWRT (CLEAR NOMAP START
      &EXIT 4
*
*
* DATA IS ON TAPE
*
-TAPE &NAME = &CONCAT &1 &2
      TAPMOUNT &1 TAP1 RO &3
      TAPE REW (TAP1
      &SK = &2 - 1
      &IF &SK EQ 0 &SKIP 1
      TAPE FSF &SK
      FILEDEF INMOVE TAP1(LRECL 3060 BLOCK 3060 RECFM U PERM DEN &3
      FILEDEF OUTMOVE DISK &NAME GTO D(LRECL 3060 BLOCK 3060 RECFM U PERM
      &STACK &UNIT
      &STACK &NAME
      &STACK GTO
      &STACK D
      LOAD FILWRT (CLEAR NOMAP START
      MOVEFILE
      DETACH 181
      FILEDEF FT09F001 DISK &NAME GTO D(LRECL 3060 BLOCK 3060 RECFM U PERM
      &EXIT 5
*
*
* GET TAPE AND FILE NUMBER FROM LARS
*
-LARS
*
*
* CHECK FOR PROPER ARGUMENTS
*
      &TEST = &DATATYPE &1
      &IF &TEST EQ CHAR &TYPE INPUTS NOT CORRECT FOR LARS DATA BASE
      &IF &TEST EQ CHAR &EXIT 6
*
      &TEST = &DATATYPE &2
      &IF &TEST EQ CHAR &TYPE INPUTS NOT CORRECT FOR LARS DATA BASE
      &IF &TEST EQ CHAR &EXIT 7
*
*
* GET LARS DISK WHICH CONTAINS THE DATA BASE
*
      GETDISK JSCDISK 19A E
*
*
```

```
* FILEDEF TERMINAL AND EXEC FILE WRITTEN DURING RUN.
*
     FILEDEF 3 TERM(PERM
     FILEDEF 5 TERM(PERM
     FILEDEF FT02F001 DISK GROINFO EXEC D1 (RECL 80 BLKSIZE 80 PERM
*
*
* IF LENGTH OF &1 (SEGMENT NUMBER) < 4 CONCATENATE 0
*
-LOOP &SEGLNG = &LENGTH &1
     &IF &SEGLNG EQ 4 &SKIP 2
     &1 = &CONCAT 0 &1
     &GOTO -LOOP
*
*
* STACK INPUTS TO ALLOW GTRUINF TO ACCESS LARS RT&E DATA BASE.
* GTRUINF WILL WRITE GTRUINFO EXEC TO ALLOW THE PASS THROUGH OF
* TAPE# FILE#.
*
     &STACK &1
     &STACK &2
*
     LOAD GTRUINF STINFORX RTEERRMX (CLEAR NOMAP START
*
*
*
* LOAD EXEC WRITTEN BY PROGRAM.
*
     EXEC GROINFO D
     REL E(DET
     &READ VARS &TAPE
     &READ VARS &FILE
     &1 = &TAPE
     &2 = &FILE
     &3 = 800
     &IF &1 NE 0 &GOTO -TAPE
     &EXIT
&END
```

```
FILE: END      EXEC     A   LARS / PURDUE UNIVERSITY                                          PAGE 001

     &CONTROL OFF
*
* END EXEC
* --------
*
* PURPOSE
* -------
*    THIS EXEC WILL CLOSE CONSOLE FILE AND PRINT THE FILE
*
* PROCEDURE
*
     SPOOL CONSOLE STOP CLOSE
     &EXIT
&END
```

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```
FILE: START    EXEC     B   LARS / PURDUE UNIVERSITY                                      PAGE 001

    &CONTROL OFF
*
*
* START EXEC
* ----------
*
*
* PURPOSE
* -------
*    THIS EXEC WILL ALLOW THE USER TO SPOOL ALL RESPONCES TO THE
*    CONSOLE.THIS IS TO BE USED WITH END EXEC WHICH WILL PRINT THE FILE.
*
*
* PROCEDURE
* ---------
*
    TAG DEV CONS HOUSTON
    SPOOL CONS START NOHOLD TO RSCS
    &EXIT
&END
```

```
*LEVEL 2.3.0 (JUNE 78)                 OS/360  FORTRAN H EXTENDED              DATE 81.140/12.33.08        PAGE   1
REQUESTED OPTIONS: NOTERM
OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
                   SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
                 C     PROGRAM FILRCALL                                                   FIL00010
                 C                                                                        FIL00020
                 C                    READ FILE INFO FOR GT FILE CLASS FILE.              FIL00030
                 C     ----------------------------------------------------               FIL00040
                 C                                                                        FIL00050
                 C                                                                        FIL00060
                 C HISTORY                                                                FIL00070
                 C -------                                                                FIL00080
                 C                                                                        FIL00090
                 C     MARY TOMPKINS     LEMSCO      03/12/81      ORIGINAL CODE          FIL00100
                 C                                                                        FIL00110
                 C                                                                        FIL00120
                 C METHOD                                                                 FIL00130
                 C ------                                                                 FIL00140
                 C                                                                        FIL00150
                 C     READ FROM RECALL FILE 22 FOR GT FILE INFO AND FILE 23 FOR          FIL00160
                 C     CLASSIFICATION FILE INFO. IF BOTH OR EITHER ARE EMPTY WRITE        FIL00170
                 C     EXEC WITH ERROR FLAG SET TO 1.IF BOTH FILES ARE AVAILABLE          FIL00180
                 C     WRITE EXEC TO FILEDEF GT AND CLASS FILE. THIS IS NECESSARY         FIL00190
                 C     ONLY BECAUSE OF THE POSSIBILITY OF THE FILE DEFNITION BEING        FIL00200
                 C     LOST ON A SYSTEM ERROR ON ONE OF THE PROGRAM EXECUTIONS.           FIL00210
                 C                                                                        FIL00220
                 C                                                                        FIL00230
                 C EXTERNAL REFERENCES                                                    FIL00240
                 C -------------------                                                    FIL00250
                 C                                                                        FIL00260
                 C     NONE.                                                              FIL00270
                 C                                                                        FIL00280
                 C                                                                        FIL00290
                 C EXCEPTIONS                                                             FIL00300
                 C ----------                                                             FIL00310
                 C                                                                        FIL00320
                 C     1.IF RECALL FILE IS EMPTY ISSUE DIAGNOSTIC MSG                     FIL00330
                 C        AND WRITE ERROR EXEC.                                           FIL00340
                 C                                                                        FIL00350
                 C                                                                        FIL00360
                 C LOCAL DECLARATIONS                                                     FIL00370
                 C ------------------                                                     FIL00380
                 C                                                                        FIL00390
ISN 0002               INTEGER NAMEGT(2)                                                  FIL00400
                 C                     GROUND TRUTH FILE NAME                             FIL00410
ISN 0003               INTEGER NAMGTY(2)                                                  FIL00420
                 C                     GROUND TRUTH FILE TYPE                             FIL00430
ISN 0004               INTEGER MODEGT                                                     FIL00440
                 C                     GROUND TRUTH FILE MODE                             FIL00450
ISN 0005               INTEGER IUNIT                                                      FIL00460
                 C                     UNIT FOR GROUND TRUTH -- 9                         FIL00470
ISN 0006               INTEGER NAMECL(2)                                                  FIL00480
                 C                     CLASS FILE NAME                                    FIL00490
ISN 0007               INTEGER NAMCTY(2)                                                  FIL00500
                 C                     CLASS FILE TYPE                                    FIL00510
ISN 0008               INTEGER MODECL                                                     FIL00520
                 C                     CLASS FILE MODE                                    FIL00530
ISN 0009               INTEGER JUNIT                                                      FIL00540
                 C                     UNIT FOR GROUND TRUTH -- 10                        FIL00550
                 C                                                                        FIL00560
                 C                                                                        FIL00570
                 C PROCEDURE                                                              FIL00580
                 C ---------                                                              FIL00590
                 C                                                                        FIL00600
                 C                                                                        FIL00610
                 C START WRITING RECALL EXEC                                              FIL00620
                 C                                                                        FIL00630
ISN 0010               WRITE(2,20)                                                        FIL00640
ISN 0011            20 FORMAT(' &CONTROL OFF')                                            FIL00650
                 C                                                                        FIL00660
                 C                                                                        FIL00670
                 C READ FROM RECALL FILE FOR GROUND TRUTH DATA                            FIL00680
                 C                                                                        FIL00690
ISN 0012               IUNIT = 0                                                          FIL00700
ISN 0013               READ(22,100,END=200)IUNIT,(NAMEGT(I),I = 1,2),                     FIL00710
                      & (NAMGTY(I),I = 1,2),MODEGT                                        FIL00720
ISN 0014           100 FORMAT(I2,2A4,2A4,A1)                                              FIL00730
```

```
*LEVEL 2.3.0 (JUNE 78)          MAIN            OS/360  FORTRAN H EXTENDED            DATE 81.140/12.33.08        PAGE   2
    ISN 0015        200 IF(IUNIT.NE.0)GO TO 400                                                   FIL00740
    ISN 0017            WRITE(5,210)                                                              FIL00750
    ISN 0018        210 FORMAT(' GROUND TRUTH FILE IS UNDEFINED')                                 FIL00760
    ISN 0019            WRITE(2,220)                                                              FIL00770
    ISN 0020        220 FORMAT(' $STACK 1')                                                       FIL00780
    ISN 0021            GO TO 400                                                                 FIL00790
                  C                                                                               FIL00800
                  C                                                                               FIL00810
                  C READ FROM RECALL FILE FOR CLASSIFICATION DATA                                 FIL00820
                  C                                                                               FIL00830
    ISN 0022        400 JUNIT = 0                                                                 FIL00840
    ISN 0023            READ(23,100,END=405)JUNIT,(NAMECL(I),I = 1,2),                            FIL00850
                       & (NAMCTY(I),I = 1,2),MODECL                                               FIL00860
    ISN 0024        405 IF(JUNIT.EQ.0)WRITE(5,410)                                                FIL00870
    ISN 0026        410 FORMAT(' CLASSIFICATION FILE IS UNDEFINED')                               FIL00880
    ISN 0027            IF(JUNIT.EQ.0.AND.IUNIT.NE.0)WRITE(2,220)                                 FIL00890
    ISN 0029            IF(JUNIT.EQ.0.OR.IUNIT.EQ.0)WRITE(2,420)                                  FIL00900
    ISN 0031        420 FORMAT(' $EXIT')                                                          FIL00910
    ISN 0032            IF(JUNIT.EQ.0.OR.IUNIT.EQ.0)GO TO 900                                     FIL00920
                  C                                                                               FIL00930
                  C                                                                               FIL00940
                  C WRITE EXEC                                                                    FIL00950
                  C                                                                               FIL00960
    ISN 0034            WRITE(2,430)                                                              FIL00970
    ISN 0035        430 FORMAT(' $STACK 0')                                                       FIL00980
    ISN 0036            WRITE(2,440)(NAMEGT(I),I = 1,2),(NAMGTY(I),I = 1,2),MODEGT                FIL00990
    ISN 0037        440 FORMAT('FI FT04F001 DISK ',2A4,' ',2A4,' ',A1                             FIL01000
                       & ,'(LRECL 3060 BLOCK 3060 PERM RECFM U')                                  FIL01010
                  C                                                                               FIL01020
    ISN 0038            WRITE(2,450)(NAMECL(I),I = 1,2),(NAMCTY(I),I = 1,2),MODECL                FIL01030
    ISN 0039        450 FORMAT('FI FT10F001 DISK ',2A4,' ',2A4,' ',A1                             FIL01040
                       & ,'(LRECL 3168 BLOCK 3168 PERM RECFM U')                                  FIL01050
    ISN 0040            WRITE(2,420)                                                              FIL01060
                  C                                                                               FIL01070
    ISN 0041        900 STOP                                                                      FIL01080
    ISN 0042            END                                                                       FIL01090

                              *****F O R T R A N   C R O S S   R E F E R E N C E   L I S T I N G*****
 SYMBOL   INTERNAL STATEMENT NUMBERS
 I        0013  0013  0013  0013  0013  0013  0023  0023  0023  0023  0023  0023  0036  0036  0036  0036  0036  0036  0038
          0038  0038  0038  0038  0038
 IUNIT    0005  0012  0013  0015  0027  0029  0032
 JUNIT    0009  0022  0023  0024  0027  0029  0032
 MODECL   0008  0023  0038
 MODEGT   0004  0013  0036
 NAMCTY   0007  0023  0038
 NAMECL   0006  0023  0038
 NAMEGT   0002  0013  0036
 NAMGTY   0003  0013  0036

                              *****F O R T R A N   C R O S S   R E F E R E N C E   L I S T I N G*****
  LABEL    DEFINED    REFERENCES
    20      0011       0010
   100      0014       0013  0023
   200      0015       0013
   210      0018       0017
   220      0020       0019  0027
   400      0022       0015  0021
   405      0024       0023
   410      0026       0024
   420      0031       0029  0040
   430      0035       0034
   440      0037       0036
   450      0039       0038
   900      0041       0032

                                                       /    MAIN /    SIZE OF PROGRAM 00044C HEXADECIMAL BYTES

    NAME    TAG    TYPE   ADD.        NAME    TAG    TYPE   ADD.        NAME    TAG    TYPE   ADD.        NAME    TAG    TYPE   ADD.
       I  F        I*4    0001AC     IUNIT  S        I*4    0001B0     JUNIT  S        I*4    0001B4    IBCOM#  F  XF   I*4    000000
  MODECL  SF       I*4    0001B8    MODEGT  SF       I*4    0001BC    NAMCTY  SF       I*4    0001C0    NAMECL  SF       I*4    0001C8
  NAMEGT  SF       I*4    0001D0    NAMGTY  SF       I*4    0001D8

 SOURCE STATEMENT LABELS
```

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*LEVEL 2.3.0 (JUNE 78)           MAIN          OS/360  FORTRAN H EXTENDED          DATE 81.140/12.33.08       PAGE    3

    LABEL  ISN   ADDR             LABEL  ISN   ADDR             LABEL  ISN   ADDR             LABEL  ISN   ADDR
      200   15  000260              400   22  000298              405   24  0002EC              900   41  000420

  COMPILER GENERATED LABELS

    LABEL  ISN   ADDR             LABEL  ISN   ADDR             LABEL  ISN   ADDR             LABEL  ISN   ADDR
   100000    1  0001F4           100001   13  000210           100002   13  000224           100007   17  00026A
   100008   23  00029C           100004   23  0002B0           100014   25  0002F6           100015   27  00030C
   200001   28  000316           100016   28  000320           100017   29  000334           200002   30  00033E
   100018   30  000348           100019   32  00035C           200003   33  000366           100020   34  000370

  FORMAT STATEMENT LABELS

    LABEL  ISN   ADDR             LABEL  ISN   ADDR             LABEL  ISN   ADDR             LABEL  ISN   ADDR
       20   11  000028              100   14  000039              210   18  000047              220   20  00006A
      410   26  000077              420   31  00009C              430   35  0000A6              440   37  000083
      450   39  0000FD

*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)

*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)

*STATISTICS*     SOURCE STATEMENTS =       41, PROGRAM SIZE =      1100, SUBPROGRAM NAME =  MAIN

*STATISTICS*  NO  DIAGNOSTICS GENERATED

****** END OF COMPILATION ******                                          292K BYTES OF CORE NOT USED
```

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OF POOR QUALITY

```
*LEVEL 2.3.0 (JUNE 78)                    OS/360  FORTRAN H EXTENDED                 DATE 81.140/12.33.53          PAGE   1

REQUESTED OPTIONS: NOTERM

OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
                   SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
                  C      PROGRAM FILWRT                                                        FIL00010
                  C                 WRITE INPUTS TO DEFGTRU/DEFCLAS EXECS TO RECALL FILE.FIL00020
                  C      --------------------------------------------------------------FIL00030
                  C                                                                            FIL00040
                  C                                                                            FIL00050
                  C HISTORY                                                                    FIL00060
                  C -------                                                                    FIL00070
                  C                                                                            FIL00080
                  C      M A TOMPKINS     LEMSCO      03/12/81      ORIGINAL CODE              FIL00090
                  C                                                                            FIL00100
                  C                                                                            FIL00110
                  C METHOD                                                                     FIL00120
                  C ------                                                                     FIL00130
                  C                                                                            FIL00140
                  C      READ FROM INPUT OF DEFGTRU/DEFCLAS STACK AND OUTPUT TO FILE.          FIL00150
                  C                                                                            FIL00160
                  C                                                                            FIL00170
                  C EXTERNAL REFERENCES                                                        FIL00180
                  C -------------------                                                        FIL00190
                  C                                                                            FIL00200
                  C      NONE.                                                                 FIL00210
                  C                                                                            FIL00220
                  C                                                                            FIL00230
                  C EXTERNAL REFERENCES                                                        FIL00240
                  C -------------------                                                        FIL00250
                  C                                                                            FIL00260
                  C      NONE.                                                                 FIL00270
                  C                                                                            FIL00280
                  C                                                                            FIL00290
                  C EXCEPTIONS                                                                 FIL00300
                  C ----------                                                                 FIL00310
                  C                                                                            FIL00320
                  C      NONE.                                                                 FIL00330
                  C                                                                            FIL00340
                  C LOCAL DECLARATIONS                                                         FIL00350
                  C ------------------                                                         FIL00360
                  C                                                                            FIL00370
  ISN 0002               INTEGER IUNIT                                                         FIL00380
                  C                 LOGICAL UNIT NUMBER OF FILE 9-6 TRUTH 10-CLASS             FIL00390
  ISN 0003               INTEGER NAME(2)                                                       FIL00400
                  C                 FILENAME                                                   FIL00410
  ISN 0004               INTEGER NAMETY(2)                                                     FIL00420
                  C                 FILENAME TYPE                                              FIL00430
  ISN 0005               INTEGER MODE                                                          FIL00440
                  C                 FILE MODE                                                  FIL00450
                  C                                                                            FIL00460
                  C                                                                            FIL00470
                  C PROCEDURE                                                                  FIL00480
                  C ---------                                                                  FIL00490
                  C                                                                            FIL00500
                  C                                                                            FIL00510
                  C READ FROM EXEC STACK                                                       FIL00520
                  C                                                                            FIL00530
  ISN 0006               READ(3,100)IUNIT                                                      FIL00540
  ISN 0007           100 FORMAT(I2)                                                            FIL00550
                  C                                                                            FIL00560
  ISN 0008               READ(3,150)(NAME(I),I = 1,2)                                          FIL00570
  ISN 0009           150 FORMAT(2A4)                                                           FIL00580
                  C                                                                            FIL00590
  ISN 0010               READ(3,150)(NAMETY(I),I = 1,2)                                        FIL00600
                  C                                                                            FIL00610
  ISN 0011               READ(3,200)MODE                                                       FIL00620
  ISN 0012           200 FORMAT(A1)                                                            FIL00630
                  C                                                                            FIL00640
                  C                                                                            FIL00650
                  C WRITE FILES                                                                FIL00660
                  C                                                                            FIL00670
  ISN 0013               IF(IUNIT.EQ.9)WRITE(22,300)IUNIT,(NAME(I),I = 1,2),                   FIL00680
                       & (NAMETY(I),I = 1,2),MODE                                              FIL00690
  ISN 0015           300 FORMAT(I2,2A4,2A4,A1)                                                 FIL00700
  ISN 0016               IF(IUNIT.EQ.10)WRITE(23,300)IUNIT,(NAME(I),I = 1,2),                  FIL00710
                       & (NAMETY(I),I = 1,2),MODE                                              FIL00720
                  C                                                                            FIL00730
```

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*LEVEL 2.3.0 (JUNE 78)           MAIN          OS/360  FORTRAN H EXTENDED            DATE 81.140/12.33.53        PAGE   2
                          C
    ISN 0018                       STOP                                                                  FIL00740
    ISN 0019                       END                                                                   FIL00750
                                                                                                         FIL00760

                                   *****F O R T R A N    C R O S S    R E F E R E N C E    L I S T I N G*****
SYMBOL   INTERNAL STATEMENT NUMBERS
I        0008   0008   0008   0010   0010   0010   0013   0013   0013   0013   0013   0013   0016   0016   0016   0016   0016   0016
MODE     0005   0011   0013   0016
NAME     0003   0008   0013   0016
IUNIT    0002   0006   0013   0013   0016   0016
NAMETY   0004   0010   0013   0016

                                   *****F O R T R A N    C R O S S    R E F E R E N C E    L I S T I N G*****
 LABEL    DEFINED     REFERENCES
  100     0007        0006
  150     0009        0008   0010
  200     0012        0011
  300     C015        0013   0016

                                                                   /     MAIN /     SIZE OF PROGRAM 000238 HEXADECIMAL BYTES
        NAME      TAG    TYPE   ADD.          NAME      TAG     TYPE   ADD.          NAME      TAG    TYPE   ADD.          NAME      TAG    TYPE   ADD.
          I     F         I*4    000040        MODE  SF           I*4    000084        NAME  SF         I*4    00008C        IUNIT  SF        I*4    000088
     IRCOM#     F   XF    I*4    000000      NAMETY  SF           I*4    0000C4

  COMPILER GENERATED LABELS

    LABEL   ISN   ADDR              LABEL   ISN   ADDR              LABEL   ISN   ADDR              LABEL   ISN   ADDR
   100000     1   0000D4           100005    14   00016C           100010    16   000188           100011    17   0001C0
   100016    18   00020C
  FORMAT STATEMENT LABELS

    LABEL   ISN   ADDR              LABEL   ISN   ADDR              LABEL   ISN   ADDR              LABEL   ISN   ADDR
     100      7   000028              150     9   00002C              200    12   000032              300    15   000036
*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(60) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
*STATISTICS*     SOURCE STATEMENTS =       19, PROGRAM SIZE =       568, SUBPROGRAM NAME =  MAIN
*STATISTICS*  NO  DIAGNOSTICS GENERATED
****** END OF COMPILATION ******                                               296K BYTES OF CORE NOT USED
```

```
*LEVEL 2.3.0 (JUNE 78)                 OS/360  FORTRAN H EXTENDED              DATE 81.141/10.13.52        PAGE   1
REQUESTED OPTIONS: NOTERM
OPTIONS IN EFFECT: NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
                   SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
                  C     PROGRAM GTRUINF                                                      GTR00010
                  C                   GET GROUND TRUTH INFO FROM LARS DATA BASE              GTR00020
                  C     ---------------------------------------------------------            GTR00030
                  C                                                                          GTR00040
                  C                                                                          GTR00050
                  C HISTORY                                                                  GTR00060
                  C -------                                                                  GTR00070
                  C     M A TOMPKINS    LEMSCO     02/04/81     ORIGINAL CODE                GTR00080
                  C                                                                          GTR00090
                  C                                                                          GTR00100
                  C METHOD                                                                   GTR00110
                  C ------                                                                   GTR00120
                  C                                                                          GTR00130
                  C     READ NUMBER OF ACQS.,SEGMENT NUMBER AND LAST TWO DIGITS OF SEG       GTR00140
                  C     YEAR. ACCESS THE LARS RT&E DATA BASE. IF SUCESSFUL WRITE GTRUINFO    GTR00150
                  C     EXEC TO TRANSMIT THE TAPE# FILE# TO THE DEFGTRU EXEC.                GTR00160
                  C                                                                          GTR00170
                  C                                                                          GTR00180
                  C EXTERNAL REFERENCES                                                      GTR00190
                  C -------------------                                                      GTR00200
                  C                                                                          GTR00210
                  C     GTINFO      LARS ROUTINE TO ACQUIRE INFO FROM LARS RT&E DATA BASE    GTR00220
                  C     RTEERR      LARS ERROR MESSAGE ROUTINE                               GTR00230
                  C                                                                          GTR00240
                  C                                                                          GTR00250
                  C EXCEPTIONS                                                               GTR00260
                  C ----------                                                               GTR00270
                  C     IF IERR <> 0 OR 4 WRITE ERROR MESSAGE AND WRITE EXEC                 GTR00280
                  C     TO TERMINATE PROGRAM.                                                GTR00290
                  C                                                                          GTR00300
                  C                                                                          GTR00310
                  C LOCAL DECLARATIONS                                                       GTR00320
                  C ------------------                                                       GTR00330
                  C                                                                          GTR00340
                  C                                                                          GTR00350
ISN 0002                INTEGER INDEX(9,64)                                                  GTR00360
                  C                          INFO ON GROUND TRUTH TAPES                      GTR00370
ISN 0003                INTEGER IYR                                                          GTR00380
                  C                          LAST 2 DIGITS OF YEAR OF GROUND TRUTH           GTR00390
ISN 0004                INTEGER IERR                                                         GTR00400
                  C                          LARS ERROR FLAG                                 GTR00410
ISN 0005                INTEGER ISEGNO                                                       GTR00420
                  C                          SEGMENT NUMBER                                  GTR00430
ISN 0006                INTEGER IDUMMY(64)                                                   GTR00440
                  C                          ARG THAT DOESN'T PERTAIN TO THIS APPLICA-       GTR00450
                  C                          TION OF LARS STANDARD  ROUTINE PARAMETERS       GTR00460
                  C                                                                          GTR00470
                  C                                                                          GTR00480
                  C PROCEDURE                                                                GTR00490
                  C ---------                                                                GTR00500
                  C                                                                          GTR00510
                  C                                                                          GTR00520
                  C READ FROM CONSOLE STACK USER INPUTS. START WRITING EXEC                   GTR00530
                  C                                                                          GTR00540
ISN 0007                WRITE(2,100)                                                         GTR00550
ISN 0008            100 FORMAT(' &CONTROL OFF')                                              GTR00560
                  C                                                                          GTR00570
ISN 0009                READ(3,110)ISEGNO                                                    GTR00580
ISN 0010            110 FORMAT(I4)                                                           GTR00590
                  C                                                                          GTR00600
ISN 0011                READ(3,120)IYR                                                       GTR00610
ISN 0012            120 FORMAT(I2)                                                           GTR00620
                  C                                                                          GTR00630
                  C                                                                          GTR00640
                  C CALL LARS ROUTINE FOR INFO.                                              GTR00650
                  C                                                                          GTR00660
ISN 0013                CALL GTINFO(ISEGNO,IYR,IDUMMY,INDEX,IERR,4,'E')                      GTR00670
                  C                                                                          GTR00680
                  C                                                                          GTR00690
                  C CHECK FOR ERROR                                                          GTR00700
                  C                                                                          GTR00710
ISN 0014                IF(IERR.EQ.0.OR.IERR.EQ.4)GO TO 160                                  GTR00720
ISN 0016                CALL RTEERR(IERR,5)                                                  GTR00730
```

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OF POOR QUALITY

```
*LEVEL 2.3.0 (JUNE 78)            MAIN            OS/360  FORTRAN H EXTENDED                DATE 81.141/10.13.52        PAGE   2
      ISN 0017          WRITE(2,150)                                                                GTR00740
      ISN 0018      150 FORMAT(' &STACK 0',/,' &EXIT')                                              GTR00750
      ISN 0019          GO TO 900                                                                   GTR00760
      ISN 0020      160 WRITE(2,180)INDEX(1,1),INDEX(2,1)                                           GTR00770
      ISN 0021      180 FORMAT(' &STACK',I5,/,' &STACK',I5,/,' &EXIT')                              GTR00780
      ISN 0022      900 STOP                                                                        GTR00790
      ISN 0023          END                                                                         GTR00800

                                 *****F O R T R A N   C R O S S   R E F E R E N C E   L I S T I N G*****
SYMBOL   INTERNAL STATEMENT NUMBERS
IYR      0003  0011  0013
IERR     0004  0013  0014  0014  0016
INDEX    0002  0013  0020  0020
GTINFO   0013
IDUMMY   0006  0013
ISEGNO   0005  0009  0013
RTEERR   0016

                                 *****F O R T R A N   C R O S S   R E F E R E N C E   L I S T I N G*****
 LABEL    DEFINED    REFERENCES
  100     000A       0007
  110     0010       0009
  120     0012       0011
  150     0018       0017
  160     0020       0014
  180     0021       0020
  900     0022       0019

                                                        /   MAIN /     SIZE OF PROGRAM 000C14 HEXADECIMAL BYTES
      NAME      TAG   TYPE  ADD.        NAME      TAG   TYPE  ADD.        NAME      TAG   TYPE  ADD.        NAME     TAG   TYPE  ADD.
       IYR SFA        I*4   00011A      IERR SFA        I*4   00011C      INDEX SFA       I*4   000124     GTINFO SF  XF          000000
    IBCOM#  F   XF    I*4   000000    IDUMMY SFA        I*4   000A24     ISEGNO SFA       I*4   000120     RTEERR SF  XF          000000

 SOURCE STATEMENT LABELS
   LABEL  ISN   ADDR           LABEL  ISN   ADDR           LABEL  ISN   ADDR           LABEL  ISN   ADDR
    160    20  0008C4            900   22  0008E8
 COMPILER GENERATED LABELS
   LABEL  ISN   ADDR           LABEL  ISN   ADDR           LABEL  ISN   ADDR           LABEL  ISN   ADDR
  100000    1  000934         200001   15  000894         100001   16  0008A0
 FORMAT STATEMENT LABELS
   LABEL  ISN   ADDR           LABEL  ISN   ADDR           LABEL  ISN   ADDR           LABEL  ISN   ADDR
    100     8  000028            110   10  000039            120   12  00003D            150   18  000041
    180    21  000057
*OPTIONS IN EFFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(80) SIZE(MAX) AUTODBL(NONE)
*OPTIONS IN EFFECT*SOURCE EBCDIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTERM IBM FLAG(I)
*STATISTICS*     SOURCE STATEMENTS =      22, PROGRAM SIZE =     3092, SUBPROGRAM NAME =  MAIN
*STATISTICS*  NO  DIAGNOSTICS GENERATED
****** END OF COMPILATION ******                                              296K BYTES OF CORE NOT USED
```

APPENDIX C

MISMAP OUTPUT EXAMPLE

```
INPUT SUMMARY

THIS IS AN EXAMPLE OF THE OPTIONAL CC FILE USED BY MISMAP. THIS
FILE IS USED AS AN INFORMATIONAL FILE.
```

```
JOB INITIATED ON 05/19/81 AT 15:13:52

        COMPARISON MAP OF CLASSIFICATION RESULTS WITH GROUND TRUTH

        GROUND TRUTH FILE -              12379365
        CLASSIFICATION FILE -            12381064

                         CHARACTER DEFINITION MATRIX

                           GROUND TRUTH CATEGORIES
                           -1-  -2-  -3-  -4-  -5-  -6-

                      -1-  "C"  "+"  "$"  "#"  "#"  "#"

                      -2-  "-"  " "  " "  "%"  "#"  "#"

         CLASSIFICATION -3-  "T"  "T"  "T"  "#"  "#"  "#"
         CATEGORIES
                      -4-  "#"  "#"  "#"  "#"  "#"  "#"

                      -5-  "#"  "#"  "#"  "#"  "#"  "#"

                      -6-  "#"  "#"  "#"  "#"  "#"  "#"

         PIXEL PURITY RANGE - FROM 1 TO 6 SUBPIXELS


         GROUND TRUTH TRANSFORMATIONS

                   1 TO  10 = 1
                  11 TO  79 = 2
                  80 TO  80 = 3
                  81 TO  91 = 2
                  92 TO  92 = 1
                  93 TO 116 = 2
                 117 TO 117 = 1
                 118 TO 163 = 2
                 164 TO 164 = 3
                 165 TO 255 = 2

         CLASSIFICATION TRANSFORMATIONS

                   1 TO  14 = 6
                  15 TO  15 = 3
                  16 TO  77 = 6
                  78 TO  78 = 2
                  79 TO  99 = 6
                 100 TO 192 = 2
                 193 TO 194 = 6
                 195 TO 195 = 1
                 196 TO 206 = 6
                 207 TO 207 = 2
                 208 TO 225 = 6
                 226 TO 226 = 2
                 227 TO 238 = 6
                 239 TO 239 = 1
                 240 TO 255 = 6


         HEADER INFORMATION FOR GROUND TRUTH FILE            12379365

         COMPUTING SYSTEM ID = PDP-11/45 TAPEOUT PROGRAM

         ACQUISITIONS USED    =

         PFC JOB IDENT.       =

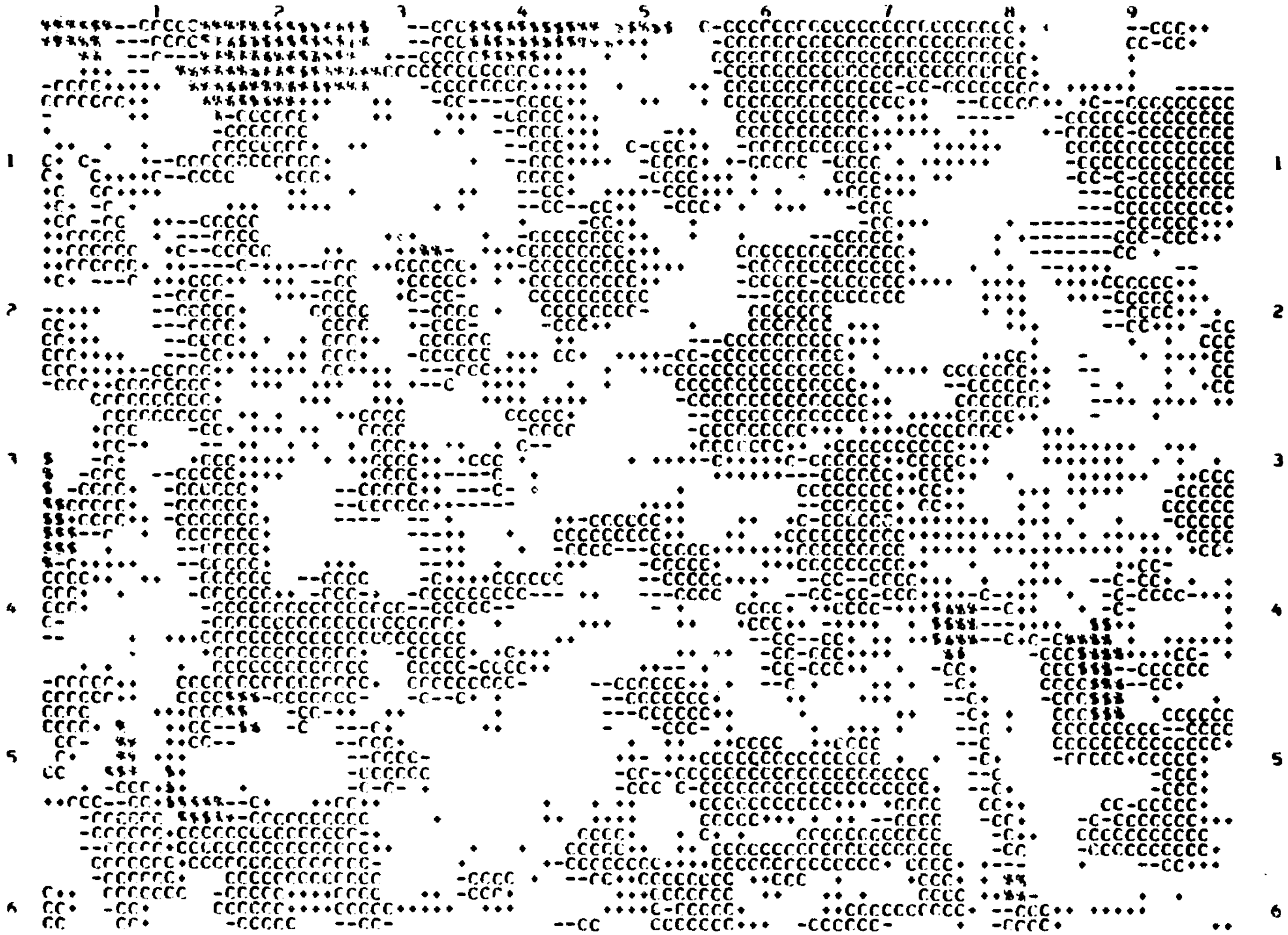
         USER SUPPLIED DATA   = FR-1978-CIK+-A+D-LIRBEA+-H<I+D-LIMEL-MA&E-1-IF-2------------


         HEADER INFORMATION FOR CLASS FILE          12381064

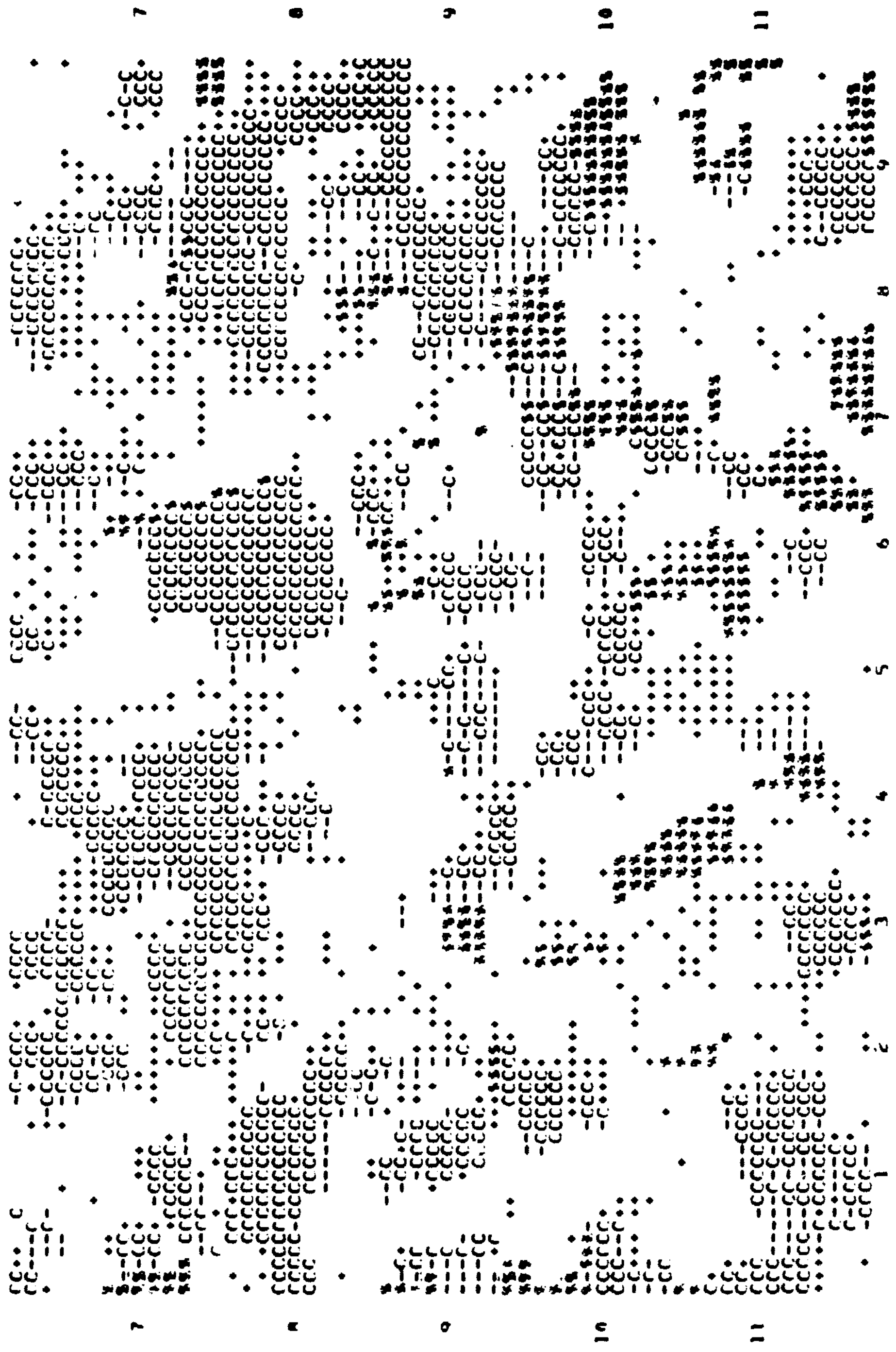
         COMPUTING SYSTEM ID = SR MULT TEMPR CLASSIFIER  FROM CLASFYG
```

```
                         (SAMPLE,LINE)
USER SUPPLIED DATA  = TO FLD  ( 58.,  3.),( 64.,  3.),( 66.,  8.),( 60.,  8.),
```

PART 1 OF COMPARISON MAP OF SEGMENT NUMBER 121
GROUND TRUTH FILE = 12379165 CLASSIFICATION FILE = 12381064


1
2
3
4
5
6
7
8
9
1
2
3
4
5
6

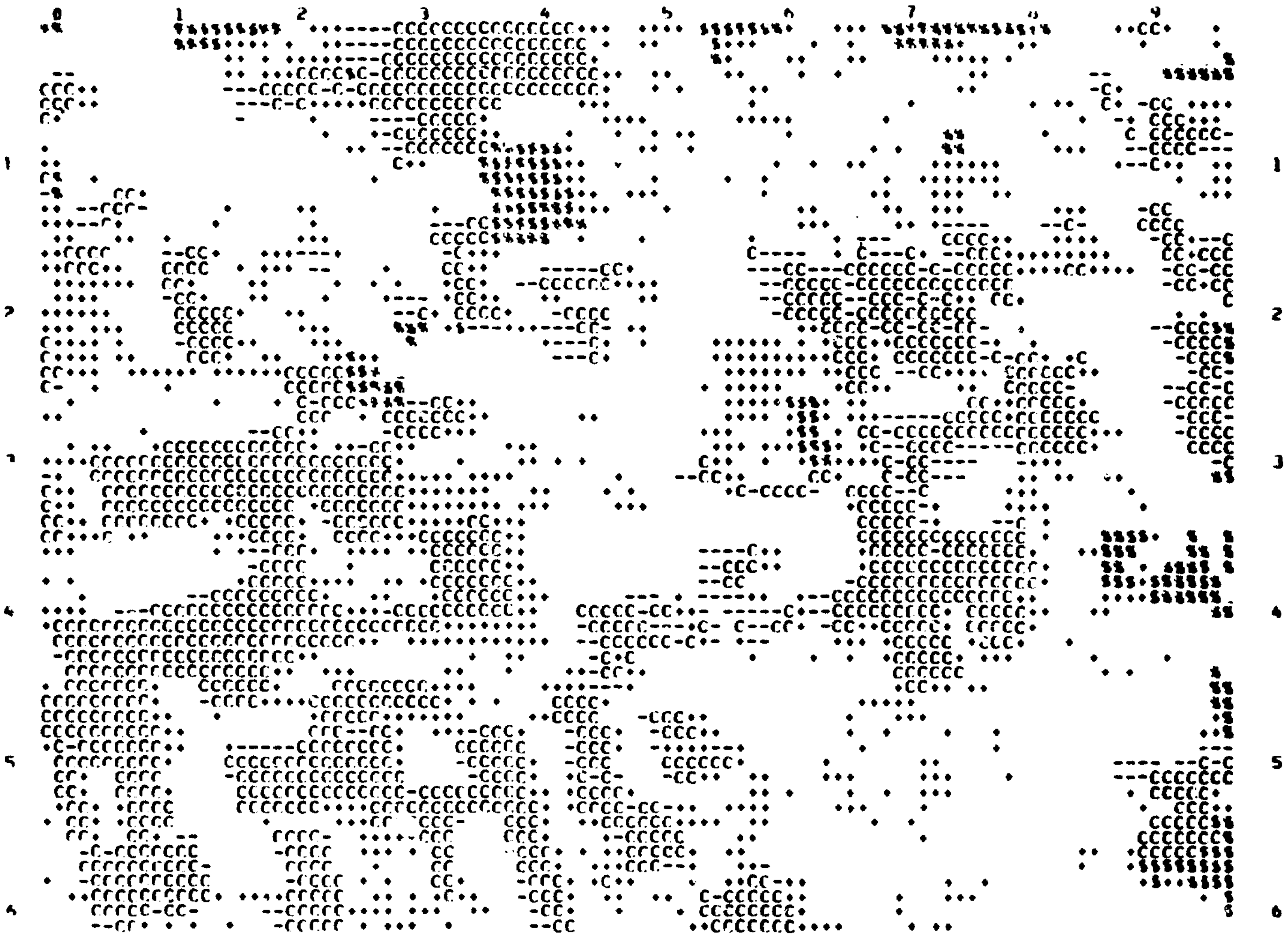
ORIGINAL PAGE IS
OF POOR QUALITY



7
8
9
10
11
8
7
6
5
4
3
2
1

ORIGINAL PAGE IS
OF POOR QUALITY

PART 2 OF COMPARISON MAP OF SEGMENT NUMBER 121
GROUND TRUTH FILE = 12379365 CLASSIFICATION FILE = 12JN1064


0
1
2
3
4
5
6
7
8
9
1
2
3
4
5
6

7
8
9
10
11
7
6
5
4
3
2
1

```
SUMMARY OF COMPARISON RESULTS

GROUND TRUTH FILE =              12379365
CLASSIFICATION FILE -            12381064

NUMBER OF PIXELS CONSIDERED IN COMPARISON =    22932.


PERCENTAGE OF SCENE IN EACH CATEGORY

                              GROUND TRUTH CATEGORIES
                     -1-    -2-    -3-    -4-    -5-    -6-   TOTAL

                1-   24.6   16.1    1.7    0.0    0.0    0.0   42.4

                2-    6.5   47.5    3.5    0.0    0.0    0.0   57.6

CLASSIFICATION  3-    0.0    0.0    0.0    0.0    0.0    0.0    0.0
CATEGORIES
                4-    0.0    0.0    0.0    0.0    0.0    0.0    0.0

                5-    0.0    0.0    0.0    0.0    0.0    0.0    0.0

                6-    0.0    0.0    0.0    0.0    0.0    0.0    0.0

             TOTAL   31.2   63.6    5.2    0.0    0.0    0.0


PERCENTAGE OF SCENE MISCLASSIFIED=   27.9
```